

The California Department of Fish and Game

Monitoring Team Annual Report

Land Management And Monitoring Program



Photo: Tim E. Hovey



Photo: Lyann Comrack

2002

Region 5



Photo: Tim E. Hovey

2002 Monitoring Team Annual Report

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**California Department of Fish and Game
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Table of Contents

Table of Contents.....	i
List of Tables and Figures.....	iii
Introduction.....	1
Vision Statement.....	1
SCR Monitoring Team.....	2
Goals and Requirements.....	2
Species.....	2
NCCP.....	4
Coordination and Collaboration.....	4
Species.....	4
Pacific Pocket Mouse.....	5
Island Fox.....	6
Light-footed Clapper Rail.....	6
Western Snowy Plover.....	8
California Least Tern.....	8
Western Gull-billed Tern.....	10
Belding’s Savannah Sparrow.....	11
Western Pond Turtle.....	13
California Red-legged Frog.....	13
Mountain Yellow-legged Frog.....	14
Arroyo Toad.....	15
Southern Steelhead Trout.....	16
Tidewater Goby.....	17
Unarmored Three-spine Stickleback.....	18
Arroyo Chub.....	19
Other Species.....	19
NCCP Plans/Regional Conservation Plans.....	19
Orange County Central/Coastal Plan.....	20
Multiple Species Conservation Plan.....	20
Multiple Habitat Conservation Plan.....	26
Internal and Regional Database Development.....	26
Exotic Species.....	27
Aquatic Species.....	27
Plants.....	31
California Department of Fish and Game Lands.....	33
Rancho Jamul Ecological Reserve.....	33

Crestridge Ecological Reserve.....	45
Boden Canyon Ecological Reserve.....	56
Otay Mountain Ecological Reserve.....	61
Hollenbeck Canyon Wildlife Area.....	66
Carlsbad Highlands Ecological Reserve.....	72
San Felipe Valley Wildlife Area.....	77
Buena Vista Lagoon Ecological Reserve.....	80
Batiquitos Lagoon Ecological Reserve.....	83
Upper Newport Bay Ecological Reserve.....	89
Monitoring and Research Contracts.....	91
Department Research and Special Projects.....	93
Status of Southern Steelhead Trout.....	93
Bullfrog Impacts on Native Systems.....	96
New Prey Item Account of Bullfrog Predation.....	99
Post Fire Impacts of Herpetofauna.....	100
Spatial and Temporal Sampling Technique Comparison.....	101
Bird Species of Special Concern	101
Conclusions and Recommendations.....	107
Species Outlines.....	109
Photo Credits.....	130

List of Tables

Table 1. Sensitive species – South Coast Region Lead Responsibilities.....	3
Table 2. Status Report. Biological Monitoring Program – Nature Reserve of Orange County.....	22
Table 3. Dept. Funded Monitoring Projects Within the MSCP 2001-2002.....	24
Table 4. Species Occurring in the Rancho Jamul ER – 2001-2002.....	36
Table 5. Species Occurring in the Crestridge ER – 2001 – 2002.....	46
Table 6. Species Occurring in the Boden Canyon ER – 2001 - 2002	57
Table 7. Species Occurring on the Otay Mountain ER - 2001 - 2002.....	63
Table 8. Species Occurring on the Hollenbeck Canyon ER - 2001 – 2002.....	67
Table 9. Species Occurring on the Carlsbad Highlands ER - 2001 – 2002.....	74
Table 10. Species Occurring on the San Felipe Wildlife Area – 2002.....	78
Table 11. Status of the Belding's Savannah Sparrow at BVLER – 1973-2002.....	81
Table 12. Species Occurring on the Batiquitos Lagoon ER – 2001 – 2002.....	85
Table 13. Monitoring and Research Contracts.....	91
Table 14. Bullfrog, <i>Rana catesbeiana</i> and Prey, <i>Thamnophis hammondi</i>	99

List of Figures

Figure 1. Aquatic, Exotic Species Routinely Encountered Within the Drainages of Southern California.....	28
Figure 2. Photograph of Rancho Jamul Ecological Reserve.....	33
Figure 3. Map of Rancho Jamul Ecological Reserve and Hollenbeck Canyon Wildlife Area	43
Figure 4. Rancho Jamul Ecological Reserve Vegetation Map.....	44
Figure 5. Photograph of Crestridge Ecological Reserve.....	45
Figure 6. Map of Crestridge Ecological Reserve.....	54
Figure 7. Vegetation Communities of Crestridge Ecological Reserve.....	55
Figure 8. Photograph of Boden Canyon Ecological Reserve.....	56
Figure 9. Map of Boden Canyon Ecological Reserve.....	60
Figure 10. Photograph of Otay Mountain Ecological Reserve.....	61
Figure 11. Map of Otay Mountain Ecological Reserve.....	65
Figure 12. Photograph of Hollenbeck Canyon Wildlife Area.....	66
Figure 13. Map of Rancho Jamul Ecological Reserve and Hollenbeck Canyon Wildlife Area.....	71
Figure 14. Photograph of Carlsbad Highlands Ecological Reserve.....	72
Figure 15. Map of Carlsbad Highlands Ecological Reserve.....	76
Figure 16. Photograph of San Felipe Valley Wildlife Area.....	77
Figure 17. Map of San Felipe Valley Wildlife Area.....	80
Figure 18. Photograph of Buena Vista Lagoon Ecological Reserve.....	81
Figure 19. Map of Buena Vista Lagoon Ecological Reserve.....	82
Figure 20. Bird Survey Grid for Batiquitos Lagoon ER.....	83

Figure 21. Photograph of Batiquitos Lagoon ER.....	84
Figure 22. Map of Batiquitos Lagoon ER.....	88
Figure 23. Photograph of Upper Newport Bay ER.....	89
Figure 24. Map of Upper Newport Bay ER.....	90
Figure 25. Examination of Bullfrog Stomachs.....	97
Figure 26. Graph of Bullfrog Diet by Quarter.....	98
Figure 27. Graph of Bullfrog Diet by Size Class.....	98
Figure 28. Native Snake as Bullfrog Diet Item (First Occurrence).....	100

I. INTRODUCTION

The California Department of Fish and Game (Department), as the Trustee Agency for the State of California's rich and diverse biological resources, has responsibility for periodic monitoring of those resources for the purpose of assuring their conservation for the benefit of the people of California. Monitoring involves assessing both the status of individual species as well as their habitats.

The South Coast Region (SCR) encompasses the five southern coastal counties of California (Santa Barbara, Ventura, Los Angeles, Orange and San Diego). This portion of the State is unique in several ways. First, it is an area that supports the highest diversity of species in the State. Second, because of the large human population and intense urbanization, more State and/or Federally-listed threatened or endangered species exist in the SCR than anywhere else in the State. Finally, the SCR has served as the proving ground for the Department's Natural Community Conservation Planning (NCCP) program, a program focused on regional multi-species conservation planning that also incorporates regional monitoring efforts.

This report is a summary of the monitoring and research-related activities conducted by the SCR Monitoring Team during 2002. Certain monitoring and research activities were conducted directly by the Monitoring Team, while others were contracted to outside experts, but under the oversight of the Monitoring Team. This report highlights and summarizes the results of the monitoring and research activities of 2002, but does not contain all of the raw data collected. If more information is desired about specific data sets, contact the SCR Monitoring Team at the SCR Regional Office in San Diego.

A. Monitoring Team Vision Statement

The SCR Monitoring Team created a vision statement to guide the implementation of the regional monitoring program:

The SCR Monitoring Team seeks to conduct a biological monitoring and research program that identifies regionally sensitive species and habitats, and seeks appropriate measures for their conservation. The monitoring program is:

- Science-based in data collection and analysis;
- Region-wide in scope;
- Balanced between ecosystem monitoring and single-species monitoring;
- Supportive of research;
- Practical, in terms of providing sound information upon which to make land management decisions;

- Providing information useful for public outreach and education programs;
- Contributing to the implementation of regional conservation plans (NCCP, Habitat Conservation Plan (HCP)), and statewide conservation goals;
- Providing expertise in the development of monitoring plans for regional conservation plans as well as Department lands in the region;
- Partnering with other parties involved in biological monitoring to coordinate collection and sharing of information.

B. SCR Monitoring Team

The SCR Monitoring Team is part of the Land Management and Monitoring Program and is supervised by Ms. Terri Stewart, Senior Biologist Supervisor. It is composed of four members, with additional Department staff assisting in monitoring-related activities as workload allows. The individual team members, along with their areas of expertise and responsibility, are:

- Lyann Comrack – Associate Biologist (Wildlife) – birds, threatened and endangered and “Special Concern” birds and mammals, Bird Species of Special Concern project management
- Tim Hovey – Associate Biologist (Fisheries) – threatened and endangered and “Special Concern” fishes, amphibians and reptiles
- David Lawhead – Associate Biologist (Wildlife)- NCCP, mammals
- Dan Marschalek – Scientific Aide – terrestrial invertebrates

The team is assisted by Meredith Osborne, Associate Biologist (Botany), Habitat Conservation Division, for sensitive plant issues and John Ekhoﬀ, Associate Biologist (Botany), Land Management and Monitoring Program, for exotic species issues.

C. Goals and Requirements

1. Species (Fish and Game Code § 2052, 2055)

SCR assumed primary responsibility for coordinating the Department’s comprehensive monitoring, research and recovery program for select endangered, threatened, rare and otherwise “sensitive” plant and animal species in January 2000. By arrangement with the Habitat Conservation Planning Branch, species that occur wholly or primarily within regional boundaries (Table 1) are monitored by SCR. SCR biologists participate in recovery planning for species listed under the California Endangered Species Act (CESA) and the federal Endangered Species Act (ESA) through membership on formal recovery teams (Pacific pocket mouse) or

on informal working groups (island fox, San Clemente Island loggerhead shrike, least Bell's vireo, California least tern, Western snowy plover). SCR biologists compile and distribute biological and status information on more wide ranging species, focusing attention on sensitive species of plants and animals. Also, SCR develops and approves research memoranda of understanding (MOUs) for these species.

Table 1. Sensitive Species – South Coast Region Lead Responsibilities

Common Name	Scientific Name	Status	Contact
Mammals			
So. California Saltmarsh Shrew	<i>Sorex ornatus salicornicus</i>	SSC	Comrack
Santa Catalina Island Shrew	<i>Sorex ornatus willetti</i>	SSC	Comrack
Pacific Pocket Mouse	<i>Perognathus longimembris pacificus</i>	FE, SSC	Lawhead
Southern Grasshopper Mouse	<i>Onychomys torridus ramona</i>	SSC	Comrack
Island Fox	<i>Urocyon littoralis</i>	ST, FPE	Comrack
Birds			
Light-footed Clapper Rail	<i>Rallus longirostris levipes</i>	SE, FE, FP	Comrack
California Least Tern	<i>Sterna antillarum browni</i>	SE, FE, FP	Comrack
San Clemente Loggerhead Shrike	<i>Lanius ludovicianus mearnsi</i>	FE, SSC	Comrack
Belding's Savannah Sparrow	<i>Passerculus sandwichensis beldingi</i>	SE	Comrack
Reptiles			
Southwestern Pond Turtle	<i>Clemmys marmorata</i>	SSC	Hovey
Coast Horned Lizard	<i>Phrynosoma coronatum spp.</i>	SSC	Hovey
Gilbert Skink	<i>Eumeces gilberti</i>		Hovey
Orange-throated Whiptail	<i>Cnemidophorus hyperythrus</i>	SSC	Hovey
Silvery Legless Lizard	<i>Anniella pulchra</i>	SSC	Hovey
San Bernardino Mountain Kingsnake	<i>Lampropeltis zonata parvirubra</i>	SSC	Hovey
San Diego Mountain Kingsnake	<i>Lampropeltis zonata pulchra</i>	SSC	Hovey
San Diego Gopher Snake	<i>Pituophis melanoleucus</i>		Hovey
Coast Patch-nosed Snake	<i>Salvadora hexalepis virgultea</i>	SSC	Hovey
Two-striped Garter Snake	<i>Thamnophis hammondi</i>	SSC	Hovey
No. Red Diamond Rattlesnake	<i>Crotalus ruber</i>		Hovey
Amphibians			
California Newt	<i>Taricha torosa</i>	SSC	Hovey
Yellow-blotched Salamander	<i>Ensatina eschscholtzi</i>	SSC	Hovey
Tiger Salamander	<i>Ambystoma tigrinum</i>	FE, SSC	Hovey
Western Spadefoot Toad	<i>Spea (Scaphiopus) hammondi</i>	SSC	Hovey
Arroyo Toad	<i>Bufo californicus</i>	FE, SSC	Hovey
Mountain Yellow-legged Frog	<i>Rana muscosa</i>	FE, SSC	Hovey
California Red-legged frog	<i>Rana aurora</i>	FT, SSC	Hovey
Fish			
Arroyo Chub	<i>Gila orcutti</i>	SSC	Hovey
Santa Ana Speckled Dace	<i>Rhinichthys osculus</i>	SSC	Hovey
Santa Ana Sucker	<i>Catostomus santaanae</i>	FT, SSC	Hovey
Unarmored Threespine Stickleback	<i>Gasterosteus aculeatus williamsoni</i>	FE, SE, FP	Hovey
Tidewater Goby	<i>Eucyclogobius newberryi</i>	FE, SSC	Hovey

Southern Steelhead Trout	<i>Oncorhynchus mykiss</i>	FE, SSC	Hovey
Invertebrates			
All sensitive species in SCR			Hovey/ Marschalek

Status key: FE = Federal endangered, FT = Federal threatened, FPE = Federal proposed endangered, SE = State endangered, ST = State threatened, SSC = Species of Special Concern, FP = State fully protected.

2. NCCP (Fish and Game Code § 2800-2840)

NCCP plans require that monitoring programs be established to assure: 1) compliance with the requirements of the plan, 2) effectiveness of the plan in conserving the biological resources the plan proposed to conserve, and 3) information is provided to an adaptive management program. The SCR monitoring program is focused primarily on the latter two items, although the first item also plays a role in the program for certain Department lands included within the NCCP preserve system. Data are collected by all NCCP plan participants on NCCP preserve lands under their jurisdiction to assess the overall effectiveness of the NCCP plan. The SCR Monitoring Team monitors Department Ecological Reserves and Wildlife Areas within NCCP planning areas to assess biological condition, management needs, and management effectiveness on those lands.

3. Coordination and Collaboration

The SCR Monitoring Team coordinates with a number of other agencies, universities and non-profit groups in the course of its monitoring activities. In some cases Monitoring Team personnel engage in joint field monitoring efforts (e.g., red-legged frog surveys with U.S. Geological Survey (USGS)), while in other cases the team oversees contracted monitoring or research work carried out by one of our partners. In addition, the Monitoring Team works closely with the U. S. Fish and Wildlife Service (USFWS), USGS – Biological Resources Division, and local jurisdictions to develop regional monitoring plans under the NCCP program. Other partners in 2002 include: San Diego State University, U.S. Forest Service, Bureau of Land Management, Conservation Biology Institute, San Diego Natural History Museum, Wildlife Research Institute, San Diego Tracking Team, Institute for Wildlife Studies, and Point Reyes Bird Observatory.

II. SPECIES

Species listed as rare, threatened, or endangered under state and/or federal law, and those taxa considered to be Species of Special Concern or included on the California Native Plant Society's Inventory of Rare and Endangered Plants in California, are given highest priority for monitoring, research and management by the SCR. Highlights from the SCR monitoring program for select species are summarized below.

A. **Pacific Pocket Mouse**
(*Perognathus longimembris pacificus*)

Size: The Pacific pocket mouse (PPM) is one of 19 recognized subspecies of little pocket mouse, and the smallest member of the family Heteromyidae (up to 131 millimeters nose to tip of tail length, and 7 to 9 grams in weight; *Recovery Plan for the Pacific Pocket Mouse*, 1998, USFWS).

Status: The PPM was emergency listed as endangered by the USFWS in 1993, and finally listed as federally endangered on September 29, 1994. The PPM is also listed as a State Species of Special Concern.

Monitoring methods: Sherman live traps.

Biological Information: The PPM is endemic to coastal southern California from the Marina del Rey/El Segundo area of Los Angeles County, south to the Mexican border. Based upon historic records, this subspecies has always been patchily distributed throughout its range. The PPM inhabits sandy substrates in open shrub lands or disturbed areas along the immediate coast. Its food preferences include primarily the seeds and stems of grasses and forbs, both native and exotic, with occasional consumption of arthropods and/or insect larva.

With the progression of intense coastal development in southern California, this animal has suffered significant habitat loss and degradation. Currently, there are only four known population centers remaining: Dana Point Headland in Orange County, and three sites on the Camp Pendleton Marine Corps Base, San Diego County (San Mateo-South, San Mateo-North, and the Oscar-1 training area). Of the four occupied sites, the Oscar-1 site supports most of the remaining individuals. Between 1993 and 1997 fewer than 150 individuals were captured during trapping surveys at all sites.

Since 1997, the SCR has contracted with various researchers, in consultation with the USFWS and other experts, to conduct an array of studies to aid in the recovery of this species. To date, studies have focused on assessment of various permanent marking techniques, surveys of the Dana Point Headlands, habitat manipulation (i.e., vegetation thinning) at Dana Point Headlands to enhance habitat, the genetic relationship between the different PPM populations, survey of the species' historic range, surveys for new populations and possible translocation sites, and a study of PPM soils preference and soil status of potential translocation sites. Reports on the completed research projects are available from the SCR. The current SCR PPM contract is focusing on analyzing the soils of three occupied sites along with soils from six to seven potential receiver sites in Orange and San Diego Counties. The PPM prefers fine sandy soils, and potential receiver sites were picked in part for the apparent presence of suitable soils. The current study is an attempt to quantitatively compare occupied sites with these receiver sites to

see whether the initial field assessments were correct. This analysis will be used to further refine the receiver site selection. This study will be completed in 2003.

Of recent concern has been the drought conditions prevailing in southern California over the past several years, with 2002 being the driest year on record. Recent surveys of certain populations have shown a significant decline in numbers. In particular, in August 2002, a SCR monitoring team biologist assisted with a USFWS-sponsored intensive trapping effort at the Dana Point Headlands site. After nine days of trapping, only two individuals were trapped. In 1993, initial surveys of the Dana Point Headlands resulted in the capture of 25-36 individuals. The reduced numbers of animals in 2002 also occurred on the Camp Pendleton site Oscar-1 (USFWS, personal communication). Follow-up surveys are expected to be conducted in 2003 to monitor the status of the populations. It is hoped that improved rainfall in 2003 will allow for some recovery of the populations.

Remarks/Recommendations: As a part of the NCCP Implementing Agreement for the Central-Coastal Orange County NCCP Plan, the SCR is involved in directing federal Endangered Species Act (Section 6) funds to study the PPM, and specifically to assess the feasibility of translocating this animal. Part of the NCCP Plan agreement calls for the possible removal of PPM from the Dana Point Headlands site. The current owner of this property is also contributing funds for research and conservation of this species.

The SCR will continue to direct Section 6 funding toward recovery projects for the PPM, with guidance from the PPM Technical Advisory Committee. Funding will likely include continued population monitoring at the known PPM sites. In addition, there is a need to use individually marked PPM to assess the structure of the PPM populations, as well as reproductive success, recruitment, dispersal, and survivorship. The low numbers of individuals trapped in recent years has hindered collection of these types of data. It is hoped that improved rainfall conditions in 2002-2003 will help the populations to recover to the point where population demographic data is more easily collected.

SCR has entered into one MOU to conduct research on PPM (Dodd).

B. Island Fox
(Urocyon littoralis)

Status: State Threatened (1971) (all islands); Federal Proposed Endangered (2001) (San Miguel, Santa Rosa, Santa Cruz and Santa Catalina Islands only).

SCR Monitoring and Conservation Program Highlights in 2002: SCR was a successful competitor for federal Endangered Species Act Section 6 "Candidate Conservation Agreement" funding for the island fox on Catalina Island and Santa Cruz Island. These funds became available at the end of 2002. Contracts to

complete the Candidate Conservation Agreement for the island Fox will begin in 2003. A comprehensive progress report will be included in the SCR annual report for 2003.

Remarks/Recommendations: At the close of 2002, SCR had issued four MOUs for research, monitoring, and/or management of the island Fox (Institute for Wildlife Studies (Garcelon), Roemer, Willett, U.C. Davis (Van Vuren)). The Island Fox Working Group meets annually in June; SCR biologists routinely participate with this group.

C. Light-footed Clapper Rail
(*Rallus longirostris levipes*)

Status: State Endangered (1971) and Federal Endangered (1970) Species; Fully Protected (FGC § 3511). Federal Recovery Plan (final 1979).

SCR Monitoring and Conservation Program Highlights in 2002: SCR was a successful competitor for federal Endangered Species Act (Section 6) funding for the light-footed clapper rail monitoring, protection, and nest platform refurbishment project. These funds became available at the end of 2002.

Monitoring methods: Clapper rails are typically monitored by two methods—spring call counts and winter high tide counts. A description of the two methods follows:

Spring call counts: Conducted from March through early May. Early morning (dawn until two hours after sunrise) and late evening (two hours before dark until dark) are the prescribed survey time periods. No surveys are conducted during periods of inclement weather. Where light-footed clapper rails are common, all locations of spontaneous calls may be mapped. In those marshes with few rails or in long, narrow channels and habitat strips, the judicious use of tape-playback is allowed to solicit a response from territorial rails. Duets and “clappering” calls are treated as indications of territoriality. Note that the use of tape-playback of clapper rail vocalizations requires a MOU from the Department.

High tide counts (winter): Observers are stationed around the perimeter of the marsh to detect rails as they move to the drier uplands as the tide rises. Canoes and kayaks may also be used to position observers throughout the marsh. Observations of rails are recorded and mapped.

Biological Information: Light-footed clapper rails have been the subject of an annual census since 1980, largely through the efforts of Richard Zembal and the USFWS. A census was conducted in 2002. Observers detected 274 pairs of clapper rails in 16 marshes, rangewide. This total suggests the population may be increasing following a series of poor years (1998-222 pairs, 1999-233 pairs, 2001-217 pairs). Upper Newport Bay Ecological Reserve is the stronghold for this

subspecies of rail; 129 pairs or 47% of the total population occur here. Tijuana Marsh NWR is second with 78 pairs (28%) while Seal Beach is a distant third with 24 pairs (9%). Of note, just these three marshes support 84% of the total light-footed clapper rail population. Contracts to conduct field surveys at all key rail marshes as well as provide predator management services at Kendall-Frost marsh have been prioritized for action in 2003. A comprehensive statewide survey report will be prepared under contract in 2003.

Remarks/Recommendations: At the close of 2002, SCR had issued two MOUs for research and/or monitoring of the light-footed clapper rail (Zemba and Sweetwater Authority; note Konecny was issued an MOU in early 2003).

D. Western Snowy Plover
(*Charadrius alexandrinus nivosus*)

Status: Federal Threatened (1993) Species; Species of Special Concern. Federal Recovery Plan (draft 2001).

SCR Monitoring and Conservation Program Highlights in 2002: SCR monitored Western snowy plover populations on the following Department-managed breeding locations in southern California: Ormond Beach (Ventura County), Bolsa Chica (Orange County), and Batiquitos Lagoon (San Diego County). SCR managed one contract to provide monitoring of snowy plovers at Ormond Beach (Wehtje Biological Services) and supervised one scientific aid to monitor snowy plovers at Bolsa Chica; Batiquitos Lagoon was monitored under a contract managed by the Reserve Manager.

Remarks/Recommendations: At the close of 2002, SCR had issued four MOUs for research and/or monitoring of the Western snowy plover (Collins, Copper, Patton, Zemba).

A Southern California Western Snowy Plover working group was formed in early 2003 to act as a clearinghouse for information for this species. This working group is facilitated by the USFWS and meets twice, annually; SCR monitoring biologists are regular participants. Data on population size and range will be presented, compiled and distributed through the USFWS.

E. California Least Tern
(*Sterna antillarum browni*)

Status: State Endangered (1971) and Federal Endangered (1970); Fully Protected (FGC § 3511). Federal Recovery Plan (final 1980).

SCR Monitoring and Conservation Program Highlights in 2002: SCR continued its comprehensive conservation program for the California least tern,

focusing on coordination/administration, research, management and monitoring activities in 2002.

Coordination/Administration: SCR successfully secured federal Endangered Species Act (Section 6) funding for 2005. Statewide least tern conservation coordination was provided for the third consecutive year through a contract with Robert Patton to compile data and prepare annual report. Weekly updates on the status of least terns and Western snowy plovers were sent to an interagency, consultant e-mail group. Two statewide annual coordination meetings (February and November) were facilitated. The statewide annual report for 2000 was reviewed, edited and prepared for publication.

Research: At the close of 2002, SCR had issued five Memoranda of Understanding (MOUs) for research and/or monitoring of the least tern (Baird, Collins, Copper, Keane, Patton). A study on food habits/reproductive success of the least tern was initiated in conjunction with Marine Region. SCR supervised one scientific aid who assisted monitors at Batiquitos Lagoon (San Diego County), three scientific aids who monitor least tern sites in Mission Bay (San Diego County) and Bolsa Chica (Orange County) and assisted the Reserve Manager to provide remote monitoring of the tern colony at Upper Newport Bay (Orange County) using volunteers. Contracts were let to provide monitoring of least terns at Venice Beach (Los Angeles County) (Keane Biological Services) and Ormond Beach (Ventura County) (Wehtje Biological Services).

Management: Two scientific aids were hired to provide predator management services in Los Angeles and Orange Counties. Predator management services were provided under contract at Batiquitos Lagoon and FAA Island, Mission Bay (San Diego County). Nesting sites were prepared at Batiquitos Lagoon, FAA Island, and Venice Beach by removing vegetation, replacing and/or repairing chick fence, incorporating interpretive signage. The Reserve Manager and volunteers removed all vegetation from Upper Newport Bay nesting islands. SCR continued efforts to enlarge the Venice tern preserve by securing all permits, including California Coastal Commission and coordinating and soliciting support for the project from neighborhood and homeowner groups in area.

Monitoring Methods: Monitoring data from each of the 30 least tern colonies in the state are collected annually and compiled by a monitoring coordinator under contract with SCR. The following data on monitoring efforts are collected at each site: dates of the first and last monitoring visits, the number of visits during the season, whether individual nests are marked (as with tongue depressors), whether individual eggs are marked (such as with numbers on shell in permanent ink), whether chicks are banded. Biological data are collected in the following categories: estimation of breeding pairs (based on number of nests, less the number of re-nests), productivity (total number of nests, number of eggs, number of chicks hatched, number of chicks reaching fledgling age, number of fledglings surviving to disperse). Mortality and predation data are also collected.

Biological Information: The California least tern experienced an unproductive year in 2002, virtually statewide. A minimum total of 3511 nesting pairs of terns was counted during the survey period. This represents a 25% decline from 2001. Further, a minimum total of 442 fledglings was counted, representing an 82% decline from 2001. Although the exact cause of the reproductive failure is unknown, monitors noted a lack of availability of appropriately-sized forage fish for the chicks, at least in the southern California colonies. Numerous observations of chick starvation were reported. Several of the colonies failed following predation events. The comprehensive annual report for the 2002 least tern breeding season will be available for distribution by late 2003.

Remarks/Recommendations :

The California Least Tern Breeding Survey 2000 Season by Robert Patton (Species Conservation and Recovery Program Report 2002-03) was published during 2002. It is available upon request.

SCR monitoring team biologists will continue to provide a statewide conservation and recovery program for the least tern in 2003, at a level of funding and effort as for previous years. Section 6 funding has been fairly consistently available to the least tern project through the years with SCR providing the state match for these funds.

F. Western Gull-billed Tern
(*Sterna nilotica vanrossemi*)

Status: Species of Special Concern, Highest Priority.

SCR Monitoring and Conservation Program Highlights in 2002: SCR Monitoring Team biologists contracted with Kathy Molina in 2002 to conduct a study on the foraging behavior and diet of breeding Western gull-billed terns on San Diego Bay. Funding for the study was made available through a federal Partnerships for Wildlife Act grant and the Rare and Endangered Species Preservation Fund (Tax Check-off). The final report was published through the Department's Species Conservation and Recovery Program in mid-2003.

Although breeding colonies of gull-billed terns have been monitored for a number of years, little information is available on the diet of the *vanrossemi* subspecies, apart from casual observations. Gull-billed terns were reported to have taken eggs and young of the endangered California least tern and the threatened Western snowy plover. A need to better understand the feeding habits of this sensitive species and its potential impacts to listed species prompted this study.

Biological Information: The following account is excerpted from the draft report entitled "Foraging Behavior and Diet of Breeding Western Gull-billed Terns (*Sterna nilotica vanrossemi*) in San Diego Bay, California" by Kathy

Molina and Dan Marschalek (January 2003). Breeding Western gull-billed terns are confined to only two locations in California: Salton Sea and San Diego Bay. The global distribution includes adjacent Baja California and the coast of Sinaloa and Sonora, Mexico. The global population of this subspecies is estimated at 700 pairs (Molina 2001). In recent years, the San Diego Bay population of gull-billed terns has numbered as many as 30 pairs.

Focal surveys were conducted from April 29 through July 26, 2002. Seven viewing stations were established in three sectors of the bay, all located in areas with known foraging areas for gull-billed terns and nesting least terns. Observations were made of all gull-billed tern activity, habitat use, and foraging events within two-minute intervals, following a pre-established protocol.

Gull-billed terns foraged over a variety of substrates including ocean intertidal, upper beaches, dunes, scrub and upland areas and along exposed estuarine mudflats. The terns foraged singly or in small loose groups; modal group size was one adult and median group size ranged from one to three birds. The diet of the gull-billed tern consisted of several classes of vertebrates and two classes of invertebrates. The diversity of prey items was similar to that reported for gull-billed terns elsewhere in their range. Main food items in decreasing order of frequency included mole crabs, small fish, lizards, and small chicks. Chicks comprised 3% of all observed captures and included killdeer (*Charadrius vociferous*), black-necked stilt (*Himantopus mexicanus*) and snowy plover.

Remarks/Recommendations: Plans to continue the study for a second year were frustrated when the federal Partnerships for Wildlife Act grant program was discontinued. Biologists from the USFWS, private ornithologists, as well as Mexican biologists plan to conduct a rangewide assessment of the status of the *vanrossemi* subspecies of gull-billed tern in 2003. In the meantime, gull-billed terns will continue to be protected on the breeding grounds in San Diego in 2003. Diet information, including documentation of predation on least tern and snowy plover chicks, will be collected by biologists working under contract with the USFWS. Gull-billed tern coordination meetings, facilitated by the USFWS, are held annually, usually in February. Future management options will be discussed in that forum.

At the close of 2002, SCR had issued two MOUs for research and/or monitoring of the gull-billed tern (Copper, Patton).

G. Belding's Savannah Sparrow
(*Passerculus sandwichensis beldingi*)

Status: State Endangered (1974).

SCR Monitoring and Conservation Program Highlights for 2002: Statewide Belding's Savannah sparrow surveys are conducted at five year intervals. A

statewide survey was conducted in 2001 under contract through the SCR with funding through SCR and the Rare and Endangered Species Preservation fund (Tax Check-off). Richard Zembal was the principal investigator for the 2001 survey; SCR biologists assisted with field assessments. The final report entitled "A Survey of the Belding's Savannah Sparrow (*Passerculus sandwichensis beldingi*) in California, 2001" by Richard Zembal and Susan M. Hoffman (Species Conservation and Recovery Program Report No. 2002-01) was published in June 2002 and is available upon request. Results are summarized below.

Monitoring Methods: Belding's Savannah sparrow breeding bird surveys were conducted from March 18 through May 30, 2001. The optimal period to conduct breeding bird surveys is March-April. Counts were completed from sunrise up to four hours later. If overcast or other conditions led to prolonged morning activity, occasionally the surveys continued into the later morning hours.

Observers detected breeding behavior and other territorial cues through observation of singing, scolding, extended perching together of mates, nest building, feeding young, aerial chases, and prolonged posting under certain circumstances. Aerial chases that were straight line indicated a single territory, with the chased bird leaving the area. Circular chases indicated two neighboring territories. Regularly spaced individuals that were perched high and fully exposed in the *Salicornia* were all counted as territory holders.

Biological Information: Belding's Savannah sparrows exhibiting breeding behavior were detected in 30 of 32 marshes surveyed in the spring of 2001. They were recorded at Goleta Slough, Santa Barbara County, south to the Tijuana Slough National Wildlife Refuge at the Mexican border. A minimum total of 2,902 pairs was detected. This is the highest state total reported since the periodic counts began in 1973 and is 23.5% higher than the next highest count, reported in 1996. The most significant increase was noted at Point Mugu which accounted for 27.8% of the total sparrow population in 2001. Major restoration of the Mugu lagoon ecosystem has brought considerable acreage under tidal influence, resulting in excellent sparrow nesting habitat. Eight marshes held more than 100 pairs each, totaling 2,154 pairs or 74.2% of the population. These critically important marshes are Mugu Lagoon, Seal Beach, Bolsa Chica, Upper Newport Bay, Santa Margarita River Estuary, Los Penasquitos Lagoon, Salt Works, and Tijuana Marsh.

Remarks/Recommendations: At the close of 2002, SCR had issued two research and/or monitoring MOUs for the Belding's Savannah sparrow (Copper, Zembal).

In 2003, SCR biologists will perform spot surveys related to project implementation and impact assessments and make management recommendations for the conservation of the species. The next statewide survey is scheduled for 2006.

H. Western Pond Turtle
(*Clemmys marmorata*)

Status: Species of Special Concern.

SCR Monitoring and Conservation Highlights in 2002: Western pond turtles (WPT) are quite often encountered during stream surveys for other species. During the 2002 sampling year WPT's were observed in San Juan Creek, San Mateo Creek, Devils Canyon Creek and San Onofre. Turtles that are captured during surveys are measured (carapace length) and sexed. SCR monitors also check for any carapace marking that may have been made by other biologists.

While specimens have been observed co-existing with exotic fish species and may even prey on those species, WPT's seem to thrive in areas void of exotic animals. However, if exotic turtle species are present (red-eared sliders, box turtles) WPT are usually out-competed by these species.

I. California Red-legged Frog
(*Rana aurora*)

Status: Federal threatened (1996).

SCR Monitoring and Conservation Highlights in 2002: The only population of California red-legged frogs (CRLF) that was routinely sampled was in San Francisquito Creek, in northern Los Angeles County. This population was sampled four times during the 2002 season. A total of eight adults, all submerged, were observed during two night surveys. Individuals were observed on the creek bottom and were easily approached. Two frogs, a male and female, were photographed in amplexis.

Several egg masses were also observed during night surveys. Eggs were attached to submerge vegetation and located less than a foot from the shoreline. All egg masses were located on the north shoreline of the creek and approximately five-to-seven inches in diameter. Bright tape was used to mark vegetation near the eggs so they could be easily identified in the future. Several egg masses were discovered that had either dropped (already hatched) or were non-viable.

A single male was observed calling and was approached during the last night of the survey. The calling sequence enabled us to also locate a large female, presumably the frog being called to. We observed these two frogs in the hopes of witnessing amplexis, but unfortunately the male swam off.

Monitoring Methods: Frogs were observed during night surveys using halogen lights and head lamps. No adults were handled only approached. Metamorphs and tadpoles were collected and observed using small beach seines and hand nets. All animals were returned back to the pools after observation.

Biological Information: Tadpoles were collected and observed during two daytime surveys conducted during the 2002 season. Individual animals were being examined for chytrid fungus, a pathogenic fungus which attacks keratin, a tough, fibrous protein that serves as a protective and resistant layer in animal skin. When frogs become infected by chytrid, this protective layer can become damaged. Since the tooth rows and jaw sheaths of tadpoles are also composed of keratin, the fungus can have a localized effect on these mouth parts. While infected tadpoles aren't killed at this stage, they usually succumb during metamorphosis. No chytrid was found during the 2002 surveys.

During one of the survey trips, a single tadpole was injured during collection, which resulted in its loss. This incident was quickly reported to USFWS as required by the MOU between the USFWS and the Department. Sampling protocol will be adjusted to avoid this type of take in the future.

During the summer of 2002 a large fire went through the upper drainage and exposed previously unknown CRLF habitat. Subsequent surveys revealed additional healthy populations, with little or no exotic fish presence. Population surveys of CRLF in San Francisquito Creek are ongoing.

J. Mountain Yellow-legged Frog
(*Rana muscosa*)

Status: Federal Endangered (1999).

SCR Monitoring and Conservation Highlights in 2002: A large-scale effort, involving several Department Regions was conducted in Little Rock Creek in the San Bernadino Mountains, San Bernardino County in October of 2002. A small population of mountain yellow-legged frogs (MYLF) occupies a stretch of Little Rock Creek. Within a stretch of creek that contains MYLF is a fish barrier that precludes upstream movement of trout. Roughly 1.5 miles further down stream is another barrier. The 1.5 miles of creek between the two fish barriers is occupied by nonnative trout.

In October several volunteers and biologists from USGS and the Department conducted three stream surveys to remove as many trout as possible in that reach.

Monitoring Methods: Several methods were employed during the three day fish removal effort. Gillnetting was attempted in the upper portion of the stream and backpack electro-shocking was the method used throughout most of the removal reach. Over the three day period it became clear that the most effective method for completely removing trout was the electro-shocker. A large number of trout, representing several age classes, were successfully removed.

Biological Information: Currently the number of MYLF's that occupy the Little Rock Creek drainage is small, no more than seven adults. It is hoped that

continued trout removal in the lower stretch will allow for downstream migration of MYLF's. The plan is to continue trout removal once a year for a period of three years. With the DFG approved stocking restriction here and the trout removal, the hopes are that the small MYLF population will expand downstream. This project is ongoing.

K. Arroyo Toad
(*Bufo californicus*)

Status: Federally Endangered (1995).

SCR Monitoring and Conservation Highlights in 2002: The 2002 sampling period was extremely poor for arroyo toad observations. Attempts were made to survey for toads at Boden Canyon, near the Santa Ysabel road crossing and upstream of the main pond, as well as Marron Valley and San Pasqual Valley. Two surveys were conducted, one in April and one in May of 2002 on the Boden property. During the April survey, a total of five arroyo toads were observed and measured. These were yearling individuals, of a single size class and probably not reproductively mature.

Additional surveys were conducted in the Boden Canyon area without success. Lack of water in some of the prime breeding habitat is likely the reason for the low numbers of toads observed. Temperature fluctuations also played a significant role in toad presence. During all surveys, temperatures were far below what would be considered optimum for toad movement.

The sandy habitat above the main pond on the Boden Canyon ER appears to be quality habitat, with the lack of seasonal water being the only quality habitat component absent. Previous annual surveys in this area have yielded a small population of animals, with varying size classes represented.

Marron Valley and San Pasqual Valley were both sampled once during the 2002 season and no toads were observed. Again, toads have been observed at both these locations in the past and the lack of water during this dry sample year was undoubtedly the reason none were observed.

Monitoring Methods: A high probability of encountering arroyo toads occurs when conducting evening surveys during the breeding season. However, animals can be observed during the day preceding or immediately following the breeding season, but not in large numbers. The highest rate of success can be obtained by surveying quality habitat, near wetted areas, from March to June during the evening. Breeding males will call to females, usually with little regard for approaching lights. The number of males can be enumerated by identifying calling sights and listening for calls. Females are frequently observed at the edges of these calling areas, in the process of choosing a mate. Pairs of male and female

toads in amplexus can be observed during the breeding season, often accompanied by numerous egg strings.

Following the peak of the breeding season, return surveys can be made to the same breeding areas to assess reproductive success of the previous season. Tadpoles, and later metamorphs, or “toadlets” can be frequently encountered in these areas. Once the “toadlets” leave the water, they may not be encountered for over a year.

Remarks: SCR issued one research and monitoring MOU for the arroyo toad (Haas).

L. Southern Steelhead Trout
(*Oncorhynchus mykiss*)

Status: Federal Endangered (1997).

SCR Monitoring and Conservation Highlights in 2002: Continued surveys were conducted on San Mateo Creek and Devils Canyon Creek, a tributary to San Mateo in northern San Diego County during the 2002 survey season. It was established that adult trout had been absent from San Mateo Creek proper since August of 2000 due to a combination of low water conditions and resource competition with exotic fish and amphibian species. Department surveys continued to monitor the presence of maturing, second-generation adults in the Devils Canyon confluence. However, drought conditions on the drainage proved too harsh for continued survival and the season ended with the collection of a single dead, adult female trout from Devils Canyon in June of 2002. While a single adult was observed in a small, holdover pool in June, no additional fish were documented in the latter part of the year.

Monitoring Methods: A total of four different monitoring methods were used to detect, not only steelhead trout, but native fish in general. These methods are back-pack electro-fishing, beach seining, snorkel surveys and passive observation. Back-pack electro-fishing is generally used to remove exotic fish species and was not utilized as a sampling tool when trout presence was expected. Beach seines were used to remove exotic fish species, and also to detect trout presence. The most utilized method for identifying trout presence, repeatedly documenting trout health, and fish identification was snorkel surveys. Passive observation was instrumental in documenting spawning behavior in trout.

Biological Information: The drought conditions during 2002 severely hampered trout survival. In the spring, a total of ten fish were routinely observed in Devils Canyon. Beginning in the summer, those numbers began to drop and holdover pools that had sustained trout up until that time began to disappear due to evaporation. The two last known individuals were observed in June of 2002. The dead fish collected in June of 2002 was a 273 mm female with no internal or

external parasites. Ten percent of her body weight was made of gonadal tissue and the eggs looked to be partially hydrated in life. This egg stage suggests that this fish may have participated in spawning activity, had the conditions improved. Four independent readers aged the fish at 2+ years of age at the time of collection.

The Devils Canyon fish represent the final chapter in the San Mateo Creek steelhead trout discovery. With no measurable amount of rain to aid them in their emigration out of the system, most of the second-generation trout most likely ended their lives as resident trout in Devils Canyon. A portion of the original, first-generation trout hopefully made it out to the ocean during the 1999 emigration discovery. The remaining fish became stranded in ephemeral pools where they had to compete for resources with exotic fish species and endure high temperatures and drought conditions.

Remarks/Recommendations: It is likely that additional southern steelhead migrations into San Mateo Creek have occurred in the past 50 years without detection. It cannot be understated, however, that this recent immigration was a unique event and that the information collected may serve to better understand the species in the southern portion of its range. The fact that San Mateo Creek remains one of the last un-dammed stream systems, combined with its location on mostly federal property, bodes well for future steelhead migrations provided that conditions are suitable.

M. Tidewater Goby
(*Eucyclogobius newberryi*)

Status: Federal Endangered (1994).

SCR Monitoring and Conservation Highlights in 2002: Presence/absence surveys were conducted once in the San Mateo Creek lagoon in the spring of 2002. Water conditions were poor and no tidewater gobies were observed. Continued surveys will be conducted during the 2003 season, as conditions will hopefully be more favorable.

Monitoring Methods: Tidewater gobies are collected using large and small beach seines.

Biological Information: The habitat of the tidewater goby is confined to shallow brackish portions of coastal streams, marshes, lagoons and estuaries between the Smith River to the north and Agua Hedionda to the south. They feed primarily on benthic invertebrates such as ostracods, amphipods and insect larvae. Spawning can occur year-round, with spring and fall peaks. The female will lay between 300-500 eggs, which the male cares for in a mucus-lined burrow. The embryos hatch out in about ten days. Mortality appears to increase after spawning and fish typically live only a few years (Swift).

Remarks/Recommendations: Surveys will be conducted in coordination with USGS and Marine Base Camp Pendleton biologists. San Mateo Creek lagoon is one of nine occupied, critical habitat creeks for the tidewater goby.

N. Unarmored Threespine Stickleback
(*Gasterosteus aculeatus williamsoni*)

Status: Federal Endangered (1970).

SCR Monitoring and Conservation Highlights in 2002: San Francisquito Creek is located in northern Los Angeles County and is occupied by the unarmored threespine stickleback (Federal endangered), the California red-legged frog (Federal threatened) and the arroyo chub (State species of special concern). During the 2002 season a total of four surveys were conducted on the drainage. These surveys focused on exotic removal, native fish health and specimen collection for non-native, aquatic parasites.

San Francisquito Creek is currently occupied by the exotic fish species such as green sunfish, gambusia, carp and goldfish, as well as swamp crayfish. A majority of these species are obviously aquarium releases, and were found to transmit internal and external parasites to native fish. Specimens were collected in coordination with USGS and the Center for Inland Waters, [Biology Department - San Diego State University (SDSU)].

Monitoring Methods: Fish were collected using beach seines and back pack electro-fishing equipment. Several areas were repeatedly seined. Collected fish were counted and measured and examined for parasites. Exotic fish were routinely collected live and transported back to SDSU for analysis. When native fish were observed with external parasites, they were also transported live to SDSU for analysis.

Biological Information: The population of stickleback within San Francisquito Creek was observed to be represented by several age classes and appeared to be healthy. On two survey occasions, individuals were observed with visible external parasites. These specimens were determined to be in poor health and we concluded that they would not survive. The specimens were transported to San Diego State University for analysis. The parasites were identified as Asian tapeworm (*Bothricephalus* spp.) and white spot disease (*Ichthiophthirius* sp.), also known in the culture circles as Ichth, and anchor-worm (*Lernaea* sp.) These parasites were most likely introduced into the system via exotic fish release.

Currently, sections of San Francisquito Creek are free of these parasites and it has been observed that infestation seems to be tied to water temperature, which is closely associated with seasonality. Monitoring of this system is ongoing.

O. Arroyo Chub
(*Gila orcutti*)

Status: State Species of Special Concern.

SCR Monitoring and Conservation Highlights in 2002: Several populations of arroyo chub are routinely surveyed during exotic fish removal and standard surveys. Several waterways which are occupied by arroyo chub are regularly evaluated for exotic presence. These streams include San Juan Creek, upper and lower Rainbow Creek, San Francisquito Creek and Bell Canyon Creek. The San Juan Creek population represents some of the largest individuals. However, this stream also possesses several aquatic exotic species. In fact, it has been observed that arroyo chub appear to be able to co-occur with exotics regularly. This does not mean that negative impacts are not present. The San Francisquito population of arroyo chub is regularly infested with external parasites introduced through exotic release.

Monitoring Methods: Fish were collected using beach seines and back pack electro-fishing equipment. Several areas were repeatedly seined, the fish were counted and measured and visually examined for parasites. Fish that were found to be infected were collected and sent to SDSU. Un-infected fish were released back into the creek after data collection.

Biological Information: The arroyo chub has been shown to physiologically adapt to survive hypoxic water conditions and wide temperature fluctuations common in south coast streams. A majority of the individuals observed during the 2002 season were seen in relatively cool, clean water, with adequate to good dissolved oxygen content.

P. Other Species

SCR issued and is tracking research and monitoring MOUs for the following other sensitive species: Black Skimmer (two issued), Elegant Tern (two issued), Summer Tanager (one issued); California Horned Lark (two issued); California Gnatcatcher (two issued), Southwestern Willow Flycatcher (one issued), Least Bell's Vireo (one issued), Santa Catalina Island Shrew (one issued in early 2003), Channel Island Spotted Skunk (two issued).

III. NCCP PLANS/REGIONAL CONSERVATION PLANS

The SCR was the region selected for the original NCCP "pilot program" plans focused on regional conservation of the coastal sage scrub ecosystem. As the plans have progressed, the conservation vision has broadened for all of these plans to encompass a wide array of additional habitats and species. There are a number of NCCP plans, or components of plans known as "subarea plans", that are completed or under development within San Diego, Orange and Los Angeles Counties. The SCR Habitat Conservation Planning staff

is responsible for NCCP plan development, in coordination with the USFWS and local jurisdictions.

An important, and required, element of each of the NCCP plans is a biological monitoring plan. The Monitoring Team, in coordination with the SCR Habitat Conservation Planning staff, plays a large role in the development and implementation of monitoring plans for NCCP plans. Monitoring issues were particularly important during 2001-2002 for three NCCP plans: 1) the Orange County Central/Coastal NCCP Plan (OCCCP), 2) the Multiple Species Conservation Plan (MSCP) – south San Diego County, and 3) the Multiple Habitat Conservation Plan (MHCP) – north San Diego County. Both the OCCCP and the MSCP are approved plans that are currently in the process of being implemented. Initial monitoring plans are in place, but are being re-evaluated for adequacy. Sampling protocols and selection of species/habitats for monitoring are being studied through various pilot monitoring efforts. The results of these efforts will be analyzed and assessed for adequacy, and modifications incorporated to improve the monitoring effort. In contrast, the MHCP is in the final stages of plan approval, and there was a significant effort during 2001-2002 to craft a comprehensive monitoring plan for this regional conservation plan. Lessons learned during the development of earlier monitoring plans were incorporated into this new plan. The following summaries recap the key biological monitoring accomplishments or developments of each of the above planning efforts:

A. Orange County Central/Coastal Plan (OCCCP)

The OCCCP was approved in 1996. After the plan was approved a monitoring plan was developed under the auspices of the Nature Reserve of Orange County, the non-profit entity established by the plan to oversee preserve monitoring. A systematic sampling protocol was established to sample selected species or species groups throughout the preserve system to assess population trends, especially as they related to habitat fragment size and urban/natural land edge effects. The monitoring plan proposed to collect data on these selected species for three to five years and then conduct an analysis of the results. The analysis would determine whether the sampling protocols were adequate to answer the monitoring questions being asked by the plan. Any necessary corrections would be made based upon the monitoring results.

In 2001-2002, data collection to assess monitoring plan adequacy continued to be done. Table 2, below, summarizes the status of the monitoring efforts to date. With the exception of the raptor monitoring studies, all of the monitoring programs listed were funded in part or in total by the Department, although not directly carried out by the SCR Monitoring Team.

B. Multiple Species Conservation Plan

The MSCP has five jurisdictions with approved “subarea plans” within the MSCP subregion: City of San Diego, City of Poway, City of Coronado, City of La

Mesa, and the County of San Diego. Two additional jurisdictions are in the process of completing their plans: the City of Chula Vista and the City of Santee. The City of Poway completed its NCCP plan in 1996, the City of San Diego in 1997, and the County of San Diego in 1998. Of the five jurisdictions that have completed their MSCP “subarea plans”, these three have the vast majority of the native habitat lands remaining. The Cities of Chula Vista and Santee will also add important areas of natural lands once their plans are completed (scheduled for completion in 2003).

The MSCP plan created a monitoring plan (Biological Monitoring Plan for the Multiple Species Conservation Program, Ogden Environmental, April 1996) to assess the status of the preserve system created under the plan, and to provide guidance for an adaptive management program. As a number of the protocols proposed in the monitoring plan have been tested in the field it has been found that they do not all function in the manner intended, and changes have been proposed. It was anticipated that the original monitoring program would need to adapt to new information and changing circumstances, and this process is currently underway with this monitoring plan. The City and County of San Diego are actively engaged in monitoring projects as required under the MSCP. A number of the monitoring efforts underway have been funded by the Department, and these are the programs that will be discussed in this report. Table 3 lists the Department contracted projects that funded monitoring efforts during the 2001-2002 period.

In addition to the funding of monitoring projects, the Department has also funded the development of a number of management plans for preserve lands under the purview of other jurisdictions within the MSCP. These include: Carmel Mountain/Del Mar Mesa, San Pasqual Valley, and the San Diego River within the City of San Diego; and the San Vicente Property within the County of San Diego. The Department has also funded the development of three management plans for three preserve areas within the City of Chula Vista.

As a contribution to adaptive management within the MSCP, the Department has funded several habitat restoration projects:

- San Diego thornmint weed eradication – City of San Diego
- Coastal sage scrub restoration (Brammer parcel) – City of San Diego
- Willowy monardella restoration (Lopez Canyon) – City of San Diego
- Otay Mesa Vernal Pool Restoration – City of San Diego

Table 2. Status Report: Biological Monitoring Program
Nature Reserve of Orange County
December 2002 (Source: The Nature Conservancy)

Study	Number of Sites/Plots	Locations	Years Implemented	Annual Cost	Reports Prepared/ Data Analysis Status
CA Gnatcatcher & Cactus Wren	40 20-HA plots CSS Stratification: Core, Edge, Fragment	Across Entire Reserve	1998-2002 <u>4 years data</u>	\$40-60K	1998 1999-2001 in prep. 3 year baseline data analysis underway¹.
Reptiles, Amphibians & Ants	90 arrays 45 CSS 9 Oak Woodland 8 Grassland 8 Chaparral Stratification: Core, Edge, Fragment	Limestone UCI Weir Canyon Peters Canyon, Rattlesnake, SCE, Orange Hills CCSP/LCWP Aliso-Wood	1995-2002 1995-2002 1998-2001 1998-2001 1998-2001 1998-2002 1999-2002 1999-2002 <u>3-4 years data</u>	\$45-90K	1998-99, 2000, 2001 in prep. 3 year baseline data analysis needed – was delayed by budget reductions.
Carnivore/Lg Mammal	20+ Track./Camera Transects Stratification: Core, Edge, Fragment	Limestone/Whiting SCE Loma Ridge Weir Canyon Irvine Park/Santiago Crk Peters Cyn, Orange Hills CCSP/LCWP Shady/Bommer Salt Creek Buck Gully, Syc Hills UCI	1998-2001 1998 1998-2001 1998-2001 1999-2001 1999-2002 1998-2001 1998-2001 1998, 2000-2001 2000-2002 1998, 2000-2001 <u>3 years data</u>	\$30-50K	1998, 1999, 2000 2001, 2002 3-year baseline data analysis needed.

MAPS <i>Monitoring Avian Productivity and Survivorship</i>	10 at CSS/OW Ecotone Goal: 12 sites Stratification: Core, Res Edge, Road Edge	Weir Canyon (2) Irvine Park LCWP (Lil. Syc Cyn) LCWP (Laurel Cyn) Aliso/Woods LCWP/Sycamore Hills LCWP (Boat Cyn) Round Cyn/Limestone Whiting Ranch	1998-2002 1998-2002 1998-2002 1998-2002 1999-2002 2001, 2002 2001, 2002 2001, 2002 2001, 2002 <u>2-4 years data</u>	\$50K	1998/99 2000, 2002 2002 in prep. 1 more year of data needed prior to baseline data analysis.
Raptors	40 Nest Sites Red-tailed Hawk, Red-shouldered Hawk, Burrowing Owl, Great- horned Owl, No. Harrier, White- tailed Kite	Scattered Across Reserve	1998-2001 <u>4+ years data</u>	\$25K	2000 Letter Report No data ever provided or analyzed; Need data presented, mapped into GIS, and analyzed if to move forward on study.
Small Mammals	24 7x7 Grids Stratification: @ reptile sampling locations Core, Edge	Aliso Woods San Joaquin Hills- West	2002 start <u>1 year data</u>	\$47K	1 st year data collection complete – 1 more year of study possible.
Vegetation	90: At all reptile/ant/small mammal plots (?)	Not started yet		\$40- 90k?	Pilot study for 2003?

**Table 3. Department Funded Monitoring Projects
within the MSCP 2001-2002**

Jurisdiction/Entity	Monitoring Study	Purpose	Start – End Date
City of San Diego	Burrowing Owl	Assess status of Burrowing Owl within the City	1/1/01 – 3/31/03
City of San Diego	Rare Plant Assessment	Gather baseline data on rare plants in the area of Black Mtn.	1/1/01 – 3/31/03
City of San Diego	Herptile and Ant Monitoring	Carmel Mtn., Del Mar Mesa	1/1/01 – 3/31/03
City of Poway	Wildlife Corridor Monitoring	Assess status of key MSCP wildlife Corridors in Poway & City of San Diego, assess wildlife use.	4/1/00 – 12/31/01
County of San Diego	Coastal Sage Scrub bird monitoring in Lakeside Linkage	Assess wildlife status on 2 County-owned parcels in Lakeside Linkage (esp. Calif. Gnatcatchers)	4/1/00 – 4/30/02
County of San Diego	Calif. Gnatcatcher distribution study in the Lakeside Linkage	Assess whether gnatcatchers cross the I-8 freeway, using banded birds.	2/1/01 – 3/31/03
County of San Diego	Use of Aerial Digital Imaging to assess habitat quality	Test whether multi-spectral ADAR imagery is useful in assessing habitat quality and changes.	4/1/00 – 3/31/02
County of San Diego	Sensitive Plant Monitoring	Conduct surveys for sensitive plant species in Hollenbeck Cyn, Santa Fe Valley, 4S Ranch, McGinty Mtn, Otay Lakes and San Vicente properties.	4/1/00 – 4/30/02
County of San Diego	Arroyo Toad and SW Pond Turtle Monitoring	Assess status of Arroyo Toad & Pond Turtle in MSCP.	1/1/02 – 3/31/04
County of San Diego	Bat Assessment and Monitoring	Assessment of bat populations within the MSCP preserve.	1/1/02 – 3/31/04
City of Chula Vista	Baseline Biological Surveys of Open Space	Conduct baseline biological surveys of 1,350 acres of preserved natural lands within City.	1/1/02 – 3/31/04

Conservation Biology Institute	Wildlife Corridor Monitoring	Continuation of corridor monitoring program of selected MSCP corridors in Poway and San Diego begun by the City of Poway.	1/1/01 – 3/31/03
Conservation Biology Institute	Regional Corridor Monitoring	Monitor corridors in Lusardi Ck, Black Mtn, and Otay Mesa; assess status of general regional corridor monitoring program; look at road kill data.	1/1/01 – 3/31/03
San Diego State University	Index of Biological Integrity	Creation of an Index of Biological Integrity for coastal sage scrub as a tool for monitoring habitat quality.	1/1/00 – 10/31/04
The Nature Conservancy	Carnivore Movement Simulation Modeling	Create a model to predict carnivore movements and wildlife corridor usage.	1/1/02 – 3/31/04
San Diego State University/USGS	Monitoring Protocol Review and Refinement for Herptiles, and Pilot Program for a Regional Database	Create working biological database using existing herp data. Assess as pilot program for other data, and analyze herp data for improvements in sampling design.	1/1/02 – 3/31/04
San Diego Natural History Museum	San Diego County Bird Atlas	Assist with data analysis and production of the County-wide bird atlas. Data analysis incorporates five years of breeding and winter season observations.	1/1/02 – 3/31/04
Wildlife Research Institute	MSCP Raptor Monitoring	Assess status of MSCP-covered raptors within the MSCP area, and propose long-term monitoring protocols.	1/1/01 – 4/30/03

C. Multiple Habitat Conservation Plan

The Multiple Habitat Conservation Program (MHCP) is anticipated to be completed and approved during 2003. During 2001-2002, much time was devoted by the Department, in concert with other agencies and consultants, in development of the MHCP Monitoring Plan. A draft plan is nearing completion, and focuses on two areas of monitoring: subregional effectiveness of the preserve system, and adaptive management of the preserve. Specific monitoring protocols for specific species or taxonomic groups have been developed for the monitoring plan. The Department will also be working on specific monitoring priorities for the Ecological Reserves it owns within the MHCP planning area, including San Elijo Lagoon, Batiquitos Lagoon, Agua Hedionda Lagoon, Buena Vista Lagoon, and Carlsbad Highlands.

D. Internal and Regional Database Development

The SCR is currently in the process of developing its own in-house Access database to house the monitoring information collected on its lands within the MSCP, as well as other portions of the SCR. This database will be linked to an ArcView-based Geographical Information System (GIS) which will allow for display of maps and other geographical information. Location data, as well as changes in species or habitat distribution and abundance, will be stored for analysis of MSCP preserve efficacy, management purposes, and public information. The SCR is also developing the ability to collect field data using hand-held "Palm Pilots." This data recording mechanism will provide greater efficiency in transferring field data to the database, and reduce errors in entry of data into the computer.

The Department is working with other NCCP collaborators and experts to develop a region-wide biological database to house the monitoring data collected by the different parties involved in the NCCP program in southern California. This database would be the repository of regional monitoring data, allow for large scale biological analyses to assess the status of the regional habitat preserve system, provide opportunities for research, and provide general information to the public on the biological resources of southern California. Whether the regional database is housed at one facility or in multiple facilities that are accessible to one another is currently undecided. It is anticipated that the database would eventually be available to interested parties through the World Wide Web. There is currently a pilot study being funded by the Department to create a framework for such a regional database. Through a contract with the San Diego State University Field Station program and the USGS, this framework is under development using an existing herpetological data set collected over the past five years in southern California.

IV. EXOTIC SPECIES

A. Aquatic Species

Nonnative or exotic species are those that have either been intentionally or unintentionally introduced into California's aquatic ecosystem. Aquatic, exotic species are quite frequently larger and more voracious than the native animals and quickly dominate when they find an absence of aquatic predators within their "foreign" environment. Not only do exotic species compete with or consume native species, they may also introduce foreign parasites into an ecosystem that is unprepared to deal with such an invasion.

Virtually every body of water within SCR has at least one species of aquatic, exotic animal currently occupying it (Figure 1). Most are fish species that are readily adapted to the degraded conditions that plague southern California drainages. As development and ground water pumping begin to reduce available water stocks, creek and stream systems start to lose their water supply. These alterations can leave a stream waterless or transform flowing creeks into a series of pooled habitats, environments that strongly favor the nonnatives over the natives.

The control of exotic species within sensitive habitat or ecosystems that contain sensitive species is a focal issue for the Monitoring Team. The periodic reduction of exotic species and their timely removal during native breeding seasons within these habitats is an ongoing process. While complete removal is highly unlikely, the reduction of exotic animals during specific periods of the year will allow native species to breed and develop without the competitive and predatory impact of nonnative species.

Several areas within SCR were routinely targeted for aquatic exotic removal during the native breeding seasons of 2002. They were: San Francisquito Creek, San Juan Creek, San Mateo Creek (upper and lower), Cottonwood Creek, Boden Canyon Pond, Rancho Jamul, Little Rock Creek, Forester Creek, Rose Canyon Creek and Rainbow Creek. The targeted exotic species were largemouth bass, green sunfish, bluegill, black bullhead, gambusia, carp, channel catfish, goldfish, swamp crayfish, African clawed frogs and bullfrogs. Methods of removal included backpack electro-shocking, seining, gigging and shooting. The following is a list of creeks, their native components and exotic species encountered.



Figure 1. Aquatic, exotic species routinely encountered within the drainages of southern California. (1) Bluegill (*Lepomis macrochirus*), (2) Carp (*Cyprinus carpio*), (3) Green sunfish (*Lepomis cyanellus*), (4) Largemouth bass (*Micropterus salmoides*), (5) Black bullhead, (*Ameiurus melas*), (6) Bullfrog, (*Rana catesbeiana*), (7) African clawed frog (*Xenopus laevis*), (8) Swamp Crayfish, (*Procambarus clarkii*), (9) Mosquito fish, (*Gambusia affinis*).

San Francisquito Creek (Los Angeles County)

San Francisquito Creek is currently home to the native arroyo chub (State Species of Special Concern), unarmored three-spine stickleback (Federally endangered) and the California red-legged frog (Federally threatened). The drainage is ephemeral and the surrounding habitat is largely undeveloped and mostly on National Forest property. Several pockets of exotic animals occur throughout the creek and routine removal efforts are conducted several times a year. The exotic species encountered on San Francisquito Creek are green sunfish, gambusia, carp, goldfish and swamp crayfish.

San Juan Creek (Orange County)

San Juan Creek is occupied by probably the healthiest population of arroyo chub in the lower portion of SCR. Other native special concern animals such as the western pond turtle, the California newt and the two-striped garter snake are routinely encountered on surveys. Directly adjacent to the survey area is occupied arroyo toad (Federally endangered) habitat. A large portion of the drainage is located on Forest Service property and adjacent to the Casper's Wilderness Area. Due to the toad habitat and arroyo chub population, regular exotic removal surveys are conducted on this drainage throughout the year. The exotic species encountered on San Juan Creek are red shiners, bullfrogs, swamp crayfish and common lab rats.

San Mateo Creek (San Diego County)

San Mateo Creek is currently the only southern SCR drainage that is occupied by a small population of southern steelhead trout (federally endangered). The holdover fish are known as rainbow trout and given a high water opportunity, can emigrate out of the system to the ocean. The tidewater goby (Federally endangered) is also present in the lower reaches of the creek, near and within the lagoon. Additionally, occupied arroyo toad (federally endangered) habitat exists at the margins of Marine Camp Pendleton Property and Forest Service Property. Due to the high occurrence of listed animals on San Mateo Creek, both the upper area (Tenaja) and lower area (upstream of the USGS gauging station) are routinely targeted for exotic removal. Exotic animals usually encountered on San Mateo Creek are largemouth bass, green sunfish, bluegill, gambusia, black bullhead, swamp crayfish and bullfrogs

Cottonwood Creek (San Diego County)

Cottonwood Creek is located approximately 25 miles east of the city of San Diego, just off Buckman Springs Road. The area usually surveyed occurs entirely on the Cleveland National Forest and is an area of heavy cattle grazing. The site, approximately two miles parallel to Buckman Springs Road is also occupied arroyo toad habitat. Two-striped garter snakes are also routinely encountered on removal surveys. Exotic animals usually encountered on Cottonwood Creek are largemouth bass, green sunfish, swamp crayfish, carp and occasionally rainbow trout. In July of 2001 a total of 260-pounds of carp were removed from a section of Cottonwood creek, directly behind Buckman Spring's elementary school.

Boden Canyon Pond (San Diego County)

Boden Canyon Pond is a man-made structure located entirely on California Department of Fish and Game Ecological Reserve property. Standing water occupied the pool up until the summer of 2001 where the combination of successive drought years and a localized fire exhausted the water supply. Directly

upstream of the pond, located on the drainage that feeds it, is a small area of occupied arroyo toad habitat. Due to the large size of the pond, little effort was made to remove the exotic fish species (largemouth bass, bluegill and catfish). Additionally, the location of the arroyo toad habitat (upstream of the main pond) impeded the interaction between arroyo toad larvae and the exotic fish species. Instead, removal efforts focused on the large population of bullfrogs that inhabited the pond. During all of 2001 and part of 2002, a total of 210 adult and juvenile bull frogs were removed from Boden Canyon Pond.

Rancho Jamul (San Diego County)

Rancho Jamul Ecological Reserve is home to a wide variety of aquatic exotic species, primarily found in man-made ponds. While few sensitive native species come into contact with the exotics, removal efforts are conducted on the reserve to reduce the spread of exotics and as a training facility for varying removal techniques. Aquatic nonnative animals encountered during surveys on Rancho Jamul are bluegill, red swamp crayfish, bull frogs, African clawed frogs & catfish.

Littlerock Creek (Riverside County)

An extensive removal effort was concentrated on a short stretch of Littlerock Creek in northern SCR. A small population of mountain yellow-legged frogs (MYLF), a federally endangered amphibian is located on a small stretch of creek on National Forest property. The frog shares this area with an abundant population of stock rainbow trout. It has been documented that rainbow trout negatively impact MYLF and to enhance the frog population, trout removal was conducted in October of 2002. Upstream and downstream barriers were identified for trout movement and three concentrated days of trout removal was conducted on the isolated stretch of Littlerock Creek. Several thousand trout were removed, representing several age classes. This removal effort is ongoing.

Rose Canyon Creek (San Diego County)

Rose Canyon Creek is a suburban run-off drainage that has very little native value. The only native species observed within the drainage is the Pacific treefrog. It does, however, have a substantial population of African clawed frogs (ACF). While several surveys were conducted to remove ACF, the lack of aquatic native potential and presence may remove this drainage from future exotic removal surveys.

Rainbow Creek (Riverside County)

Rainbow Creek is located near the Santa Margarita River (SMR) and is still occupied by a thriving population of arroyo chub. Periodic trips were made during surveys to SMR to remove exotics fish species from Rainbow Creek. To date, only one species of exotic fish (green sunfish) occupies the creek. The creek

location, wedged between housing developments, makes the arroyo chub population tenuous at best.

Exotic removal surveys were not limited to the drainages listed, however, due to their sensitive native component; these waterways were a high priority for the monitoring team during the 2002 season.

B. Plant Species

The SCR Land Management team has a staff position assigned to monitor and manage exotic plant species on Ecological Reserves within San Diego County only. Particular attention is focused on controlling the following aggressive exotics species: tamarisk (*Tamarix* spp.), Eucalyptus (*Eucalyptus* spp.), giant cane (*Arundo donax*), pampas grass (*Cortaderia jubata*), ice plant (*Carpobrotus* spp.), Myoporum (*Myoporum laetum*), tree tobacco (*Nicotiana glauca*), thistle (various members of Family Asteraceae), castor bean (*Ricinus communis*), and cocklebur (*Xanthium spinosum*). The following accounts list the status of exotic plant inventory and control efforts on those Ecological Reserves (ERs):

Agua Hedionda Lagoon ER: Field inventory of exotic plant species is complete. The assessment report is in draft form. Volunteer manual abatement has just begun on some populations of ice plant and pampas grass.

Batiquitos Lagoon ER: Field assessment and inventory are complete. The assessment report is in draft form. Initial abatement on 100% of pampas grass is complete, giant cane populations have been reduced by ~33% and several tamarisks were abated at the end of November 2002. One important finding: a non-native haplotype of *Phragmites* was discovered here in October of 2002.

Boden Canyon ER: Field assessment and inventory are complete. Initial abatement on all targeted species complete as of October 2002, except for one small grove of Eucalyptus. The grove will be addressed before December 2003.

Blue Sky ER: Field assessment is complete. Initial abatement of all targeted species was completed by October 2002.

Buena Vista Lagoon ER: Field assessment is incomplete but exotic plant issues are generally understood. Restoration and weed abatement at the public parking lot and viewing area in February 2002 was very successful. Annual pest plant abatement continues in the area and to the easternmost portion of the reserve around Lagoon View Dr. and the Highway 78 Caltrans property. Abatement has not begun on the targeted species but should begin in Fall 2004.

Carlsbad Highlands ER: Detailed field assessment and inventory are ~95% complete and the status of exotic plants is understood. The assessment is in draft

form. Control of non-native grasses and mustards has been done on a few acres of "old field" type feral agriculture land.

Crestridge ER: Field assessment and inventory are complete. The assessment is in draft form. Initial abatement started on targeted species in October 2002, and was completed in December 2002 by the Urban Corps of San Diego. Follow-up treatments will take place in summer 2003, as will the abatement of the few pampas grass patches that still exist.

Dairy Mart Ponds ER: This parcel will be transferred to San Diego County Parks; the Department will fund invasives removal and some restoration.

McGinty Mountain ER: Field assessment and inventory are complete. The assessment is in draft form.

Otay Mountain ER: Field assessment and inventory are complete. All primary targeted exotic plants except one species have been abated. An olive (Family Oleaceae) grove of ~100 individuals and ~100 wildings from that population are all that are left. The grove should be addressed by winter 2004.

Plaisted Creek ER: Field assessment and inventory are incomplete but exotic plant species issues are well understood. This ER's non-native invasive plant situation should not present a major problem. No plants have yet been abated.

Rancho Jamul ER: All targeted species have been treated; minor follow-up treatments will occur. An unexpected flush of milk thistle (*Silybum marianum*) will be addressed in the summer of 2004. The populations have been mapped.

San Dieguito Lagoon ER: Field assessment is incomplete but is well understood. There are no significant obstacles anticipated for the abatement activities at this ER for the targeted species. No abatement has been done.

San Elijo Lagoon ER: Field assessment and inventory are completed for the targeted exotic species. Abatement activities were begun in September 2002 by the San Elijo Lagoon Conservancy (SELC), San Diego County. Park employees, conservancy members and volunteers were trained in herbicide application. No other major abatement has been implemented. A report from SELC will be submitted to the Department pertaining to the \$233,000 Coastal Conservancy grant to map and abate the targeted plants.

Sycuan Peak ER: A detailed field assessment and inventory have not been completed but are well understood from personal communication with the ER land manager and from field assessment work by SCR scientific aides. The amount of abatement work on targeted exotic species will not be extensive.

Walker Canyon ER: Field assessment and inventory have been completed as well as the entire initial exotic species removal treatment for the reserve. Walker Canyon had the highest exotic plant infestation of all the reserves except the San Elijo Lagoon ER. However, the infestation at Walker Canyon was limited to one species, tamarisk.

V. CALIFORNIA DEPARTMENT OF FISH AND GAME LANDS

Many Department lands are part of regional preserve systems. Baseline inventory has been the initial focus of monitoring for many of the properties.

Rancho Jamul Ecological Reserve



Figure 2. Rancho Jamul Ecological Reserve

The Rancho Jamul ER is a 3,700-acre property located in southern San Diego County near the community of Jamul (Figure 3). The property has a long history of human use, including row-crop and grain agriculture, and livestock grazing. The Department purchased the property in phases between 1998 and 2001 for the primary purpose of sensitive habitat and species conservation. This site is an important component of the MSCP multi-habitat preserve system in southwestern San Diego County, supporting large areas of coastal sage scrub, annual grasslands and riparian habitat. The MSCP is a subregional plan under the auspices of the State's NCCP program.

Baseline Resource Inventory

During 2001-2002 an extensive biological inventory was conducted on the Rancho Jamul ER property. Survey work was conducted by the Western Ecological Research Center of the USGS, as well as by SCR biologists, to assess the status of fish, wildlife, and plant resources on the site. In the course of this baseline resource inventory, permanent long-term monitoring sites were established that can be sampled by SCR biologists in the future to monitor changes in vegetation and species over time in response to natural variation and human-caused impacts. This information will be used in an adaptive management program for the property, and to contribute to regional NCCP monitoring goals.

For a detailed discussion of the USGS survey results for Rancho Jamul, please refer to the Department report: *Baseline Biodiversity Survey for the Rancho Jamul Ecological Reserve* (USGS, 2002). The following discussion will be a brief summary of the methods and results discussed in this report, plus additional information collected by Department biologists. The following biological sampling was conducted during 2001-2002:

1. Sixty-eight bird point count stations (50 m radius), sampled twice in 2001 (USGS).
2. Twenty-one sampling stations for amphibians, reptiles, small mammals, and ants:
a) twenty-one pitfall trap arrays (seven traps/array) were established for trapping amphibians and reptiles; b) each array site was also used as a small mammal trapping site (18 Sherman live traps/site); and c) small pit traps were used to collect ants at each of the 21 sample sites (USGS).
3. Vegetation map, including mapping of concentrations of exotic plant species (by Dr. John O'Leary of San Diego State University).
4. Rare/sensitive plant survey (by Scott McMillen)
5. Aquatic resources surveyed at seven ponds (seining, dip nets, and traps) (USGS).
6. Bat surveys at 12 locations (including observations, mist-netting, and sonic detection), 14 nights of survey effort (USGS).
7. Carnivore/large mammals: seven track transects (including scent stations) and five remotely-triggered cameras (USGS).
8. Species-specific surveys: a) least Bell's vireo surveys conducted by Wildlands, Inc. as a requirement for monitoring its wetland mitigation bank; b) grasshopper sparrow preliminary assessment of use areas by SCR biologists for possible detailed monitoring in the future.
9. Raptor surveys: general raptor survey of portions of the property by the Wildlife Research Institute as part of a larger raptor survey of the MSCP area.

Key findings:

1. Refer to Table 4 for a listing of all vertebrate species found on the Rancho Jamul ER during the baseline inventory surveys.

2. No non-native ant species were found on Rancho Jamul ER. There was specific concern that the Argentine ant would be present, since the property has had a long history of human use, but this proved not to be an issue.
3. Refer to Figure 4 for the current Rancho Jamul ER vegetation map.
4. Six of the twelve bat species detected on the property are listed as California Species of Special Concern: Yuma myotis, Townsend's big-eared bat, pallid bat, pocketed free-tailed bat, big free-tailed bat, and the Western mastiff bat. Two species (Yuma myotis and big brown bat) were documented to breed on-site.
5. A total of 108 bird species was found on the property, through bird point count sampling or casual observation. Twenty-one of the species observed are considered sensitive:

White-tailed kite	FP
Northern harrier	SSC, MSCP
Cooper's hawk	SSC, MSCP
Golden eagle	FP, MSCP
Merlin	SSC
American peregrine falcon	SE, FP, MSCP
Prairie falcon	SSC
Burrowing owl	SSC, MSCP
Long-eared owl	SSC
Willow flycatcher	SE
Loggerhead shrike	SSC
Least Bell's vireo	SE, FE, MSCP
California horned lark	SSC
California gnatcatcher	FT, SSC, MSCP
Western bluebird	MSCP
Swainson's thrush	SSC
Yellow warbler	SSC
Yellow-breasted chat	SSC
So. Calif. Rufous-crowned sparrow	SSC, MSCP
Bell's sage sparrow	SSC
Grasshopper sparrow	SSC

SE-State endangered; FE-Federal endangered; FT-Federal threatened; FP-State fully protected; SSC-California Species of Special Concern; MSCP-MSCP covered species.

6. Twenty-nine reptile and amphibian species were detected (pitfall traps, aquatic surveys and incidental observations). Two species, the bullfrog and African clawed frog, are non-native. Five species are considered sensitive (orange-throated whiptail, coast horned lizard, Western patch-nosed snake, two-striped garter snake, red diamond rattlesnake, and the Western spadefoot toad).

7. Quino checkerspot butterfly, a federally-endangered species, was detected during focused surveys by the Department and USGS biologists.
8. Eighteen rare plant species were found during extensive surveys in the 2001-2002 period, two of which are listed as State-endangered and Federally-threatened: San Diego thornmint (*Acanthomintha ilicifolia*) and Otay tarplant (*Deinandra [Hemizonia] conjugens*). Both listed plants are associated with clay soils on-site.

Research

A research project is currently underway on the Rancho Jamul ER to assess the quality of coastal sage scrub habitat in relation to a suite of biological and landscape variables. The Department is funding research by Dr. Jay Diffendorfer at San Diego State University to create an Index of Biological Integrity for the coastal sage scrub ecosystem. Extensive wildlife and vegetation sampling is being done at a number of sites in southern California, including the Rancho Jamul ER, to try and create an index of habitat quality by measuring those biological elements that appear most sensitive to various levels of habitat degradation. Measurements are being taken across a gradient of disturbance within the sage scrub ecosystem. Biological elements being measured include, bird diversity and abundance, reptile/amphibian diversity and abundance, small mammal diversity and abundance, vegetation (including exotic plant species), and insect communities. In addition, landscape features such as habitat patch size and distance of patch to the next closest patch will be assessed. Field data was collected throughout 2002, and a second years' worth of data will be collected in 2003. The final report is expected in the summer of 2004.

Management Plan

Now that the baseline biological inventory of the Rancho Jamul ER has been completed, the Department plans on writing the management plan for the ER during 2003. A draft management plan will be circulated for public review and input through the California Environmental Quality Act (CEQA) process. Public input will be reviewed and incorporated where appropriate before the plan is finalized.

Table 4: Species Occurring in the Rancho Jamul ER – 2001-2002

MAMMALS			
Common Name	Scientific Name	Status	Comments*
Virginia Opossum	<i>Didelphis virginiana</i>	I	TS
Ornate Shrew	<i>Sorex ornatus</i>		PF
Desert Shrew	<i>Notiosorex crawfordi</i>		PF
Yuma Myotis	<i>Myotis yumanensis</i>	SSC	BS
California Myotis	<i>Myotis californicus</i>		BS
W. Small-footed Myotis	<i>Myotis ciliolabrum</i>		BS
Western Pipistrelle	<i>Pipistrellus hesperus</i>		BS
Big Brown Bat	<i>Eptesicus fuscus</i>		BS

Hoary Bat	<i>Lasiurus cinereus</i>		BS
Townsend's Big-eared Bat	<i>Corynorhinus (Plecotus) townsendii</i>	SSC	BS
Pallid Bat	<i>Antrozous pallidus</i>	SSC	BS
Brazilian Free-tailed Bat	<i>Tadarida brasiliensis</i>		BS
Pocketed Free-tailed Bat	<i>Nyctinomops femorosacca</i>	SSC	BS
Big Free-tailed Bat	<i>Nyctinomops macrotis</i>	SSC	BS
Western Mastiff Bat	<i>Eumops perotis</i>	SSC	BS
Audubon's (Desert) Cottontail	<i>Sylvilagus audubonii</i>		RC, TS
Black-tailed Jackrabbit	<i>Lepus californicus</i>	MSCP	RC
California Ground Squirrel	<i>Spermophilus beecheyi</i>		TS
Botta's Pocket Gopher	<i>Thomomys bottae</i>		PF
San Diego Pocket Mouse	<i>Chaetodipus fallax</i>		PF, ST
Dulzura (San Diego) Kangaroo Rat	<i>Dipodomys simulans</i>		PF, ST
W. Harvest Mouse	<i>Reithrodontomys megalotis</i>		PF
Cactus Mouse	<i>Peromyscus eremicus</i>		PF, ST
California Mouse	<i>Peromyscus californicus</i>		PF
Desert Woodrat	<i>Neotoma lepida.</i>	SSC	PF, ST
House Mouse	<i>Mus musculus</i>	I	ST
California Vole	<i>Microtus californicus</i>		PF
Domestic Dog	<i>Canis familiaris</i>	I	RC, TS
Coyote	<i>Canis latrans</i>		RC, TS
Gray fox	<i>Urocyon cinereoargenteus</i>		TS
Raccoon	<i>Procyon lotor</i>		TS
W. Spotted Skunk	<i>Spilogale gracilis</i>		TS
Striped Skunk	<i>Mephitis mephitis</i>		RC, TS
Long-tailed Weasel	<i>Mustela frenata</i>		1 dead in cistern (DFG)
Feral Cat	<i>Felis cattus</i>	I	TS
Bobcat	<i>Lynx rufus</i>		RC, TS
Mountain Lion	<i>Puma concolor</i>	MSCP	RC
Mule Deer	<i>Odocoileus hemionus</i>	MSCP	RC, TS

BIRDS

Common Name	Scientific Name	Status	Comments*
Eared Grebe	<i>Podiceps nigricollis</i>		IN
Great Blue Heron	<i>Ardea herodias</i>		IN (DFG)
Snowy Egret	<i>Egretta thula</i>		IN
Green Heron	<i>Butorides virescens</i>		BP
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>		IN
Turkey Vulture	<i>Cathartes aura</i>		IN
Mallard	<i>Anas platyrhynchos</i>		BP
Ring-necked Duck	<i>Aythya collaris</i>		IN
Bufflehead	<i>Bucephala albeola</i>		IN

White-tailed Kite	<i>Elanus leucurus</i>	FP	BP
Northern Harrier	<i>Circus cyaneus</i>	SSC, MSCP	IN
Sharp-shinned Hawk	<i>Accipiter striatus</i>		IN (DFG)
Cooper's Hawk	<i>Accipiter cooperii</i>	SSC, MSCP	IN (DFG)
Red-shouldered Hawk	<i>Buteo lineatus</i>		BP
Red-tailed Hawk	<i>Buteo jamaicensis</i>		BP
Golden Eagle	<i>Aquila chrysaetos</i>	FP, MSCP	IN (DFG)
American Kestrel	<i>Falco sparverius</i>		BP
Merlin	<i>Falco columbarius</i>	SSC	BP
Peregrine Falcon	<i>Falco peregrinus</i>	SE, FP, MSCP	BP
Prairie Falcon	<i>Falco mexicanus</i>	SSC	IN
Ring-necked Pheasant	<i>Phasianus colchicus</i>	I	IN
California Quail	<i>Callipepla californica</i>		BP
Killdeer	<i>Charadrius vociferus</i>		BP
Greater Yellowlegs	<i>Tringa melanoleuca</i>		IN
Mourning Dove	<i>Zenaida macroura</i>		BP
Greater Roadrunner	<i>Geococcyx californianus</i>		BP,RC
Barn Owl	<i>Tyto alba</i>		NT
Great Horned Owl	<i>Bubo virginianus</i>		NT
Burrowing Owl	<i>Speotyto (Athene) cunicularia</i>	SSC, MSCP	NT
Long-eared Owl	<i>Asio otus</i>	SSC	NT
Common Poorwill	<i>Phalaenoptilus nuttallii</i>		NT
Black-chinned Hummingbird	<i>Archilochus alexandri</i>		IN
Anna's Hummingbird	<i>Calypte anna</i>		BP
Costa's Hummingbird	<i>Calypte costae</i>		BP
Allen's Hummingbird	<i>Selasphorus sp.</i>		BP
Belted Kingfisher	<i>Ceryle alcyon</i>		IN
Acorn Woodpecker	<i>Melanerpes formicivorus</i>		BP
Nuttall's Woodpecker	<i>Picoides nuttallii</i>		BP
Northern Flicker	<i>Colaptes auratus</i>		IN
Western Wood-pewee	<i>Contopus sordidulus</i>		IN (DFG)
Willow Flycatcher	<i>Empidonax trailii</i>	SE	IN (DFG)
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>		IN
Black Phoebe	<i>Sayornis nigricans</i>		BP
Say's Phoebe	<i>Sayornis saya</i>		IN
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>		BP
Cassin's Kingbird	<i>Tyrannus vociferans</i>		IN (DFG)
Western Kingbird	<i>Tyrannus verticalis</i>		BP
Loggerhead Shrike	<i>Lanius ludovicianus</i>	SSC	BP

Least Bell's Vireo	<i>Vireo bellii pusillus</i>	FE, SE, MSCP	BP
Cassin's Vireo	<i>Vireo cassinii</i>		IN (DFG)
Hutton's Vireo	<i>Vireo huttoni</i>		IN (DFG)
Warbling Vireo	<i>Vireo gilvus</i>		BP
Magpie Jay	<i>Calocitta colliei</i>	I	IN
Western Scrub Jay	<i>Aphelocoma californica</i>		BP
American Crow	<i>Corvus brachyrhynchos</i>		BP
Common Raven	<i>Corvus corax</i>		BP
Horned Lark	<i>Eremophila alpestris actia</i>	SSC	BP
Tree Swallow	<i>Tachycineta bicolor</i>		IN (DFG)
Violet-green Swallow	<i>Tachycineta thalassina</i>		BP
N. Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>		BP
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>		BP
Oak Titmouse	<i>Baeolophus inornatus</i>		BP
Bushtit	<i>Psaltiriparus minimus</i>		BP
Bewick's Wren	<i>Thryomanes bewickii</i>		BP
House Wren	<i>Troglodytes aedon</i>		IN
California Gnatcatcher	<i>Poliophtila californica</i>	FT, SSC, MSCP	BP
Western Bluebird	<i>Sialia mexicana</i>	MSCP	IN
Mountain Bluebird	<i>Sialia currucoides</i>		IN
Swainson's Thrush	<i>Catharus ustulatus</i>	SSC	IN (DFG)
Wrentit	<i>Chamaea fasciata</i>		BP
Northern Mockingbird	<i>Mimus polyglottos</i>		BP
California Thrasher	<i>Toxostoma redivivum</i>		BP
European Starling	<i>Sturnus vulgaris</i>	I	BP
Phainopepla	<i>Phainopepla nitens</i>		BP
Orange-crowned Warbler	<i>Vermivora celata</i>		BP
Nashville Warbler	<i>Vermivora ruficapilla</i>		BP
Yellow Warbler	<i>Dendroica petechia</i>	SSC	BP
Yellow-rumped Warbler	<i>Dendroica coronata</i>		BP
Townsend's Warbler	<i>Dendroica townsendi</i>		BP
Common Yellowthroat	<i>Geothlypis trichas</i>		BP
Wilson's Warbler	<i>Wilsonia pusilla</i>		IN (DFG)
Yellow-breasted Chat	<i>Icteria virens</i>	SSC	BP
Western Tanager	<i>Piranga ludoviciana</i>		BP
Spotted Towhee	<i>Pipilo maculatus</i>		BP
California Towhee	<i>Pipilo crissalis</i>		BP
So. Calif. Rufous-crowned Sparrow	<i>Aimophila ruficeps canescens</i>	SSC, MSCP	BP
Chipping Sparrow	<i>Spizella passerina</i>		IN
Vesper Sparrow	<i>Poocetes gramineus</i>		IN (DFG)
Lark Sparrow	<i>Chondestes grammacus</i>		BP

Bell's Sage Sparrow	<i>Amphispiza belli belli</i>	SSC, MSCP	BP
Savannah Sparrow	<i>Passerculus sandwichensis</i>		BP
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	SSC	BP
Song Sparrow	<i>Melospiza melodia</i>		BP
Lincoln's Sparrow	<i>Melospiza lincolni</i>		IN (DFG)
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>		BP
Dark-eyed Junco	<i>Junco hyemalis</i>		IN
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>		IN
Blue Grosbeak	<i>Guiraca caerulea</i>		BP
Lazuli Bunting	<i>Passerina amoena</i>		BP, RC
Red-winged Blackbird	<i>Agelaius phoeniceus</i>		BP
Western Meadowlark	<i>Sturnella neglecta</i>		BP
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>		BP
Brown-headed Cowbird	<i>Molothrus ater</i>		IN (DFG)
Bullock's Oriole	<i>Icterus bullockii</i>		BP
House Finch	<i>Carpodacus mexicanus</i>		BP
Lesser Goldfinch	<i>Carduelis psaltria</i>		BP
Lawrence's Goldfinch	<i>Carduelis lawrencei</i>		BP
American Goldfinch	<i>Carduelis tristis</i>		BP
REPTILES			
Common Name	Scientific Name	Status	Comments*
Granite Spiny Lizard	<i>Sceloporus orcutti</i>		PF
Western Fence Lizard	<i>Sceloporus occidentalis</i>		PF
Side-blotched Lizard	<i>Uta stansburiana</i>		PF
Coast Horned Lizard	<i>Phrynosoma coronatum</i>	SSC, MSCP	PF
Granite Night Lizard	<i>Xantusia henshawi</i>		PF
Western Skink	<i>Eumeces skiltonianus</i>		PF
Gilbert's Skink	<i>Eumeces gilberti</i>		PF
Orange-throated Whiptail	<i>Cnemidophorus hyperythrus</i>	SSC, MSCP	PF
Western Whiptail	<i>Cnemidophorus tigris</i>		PF
Southern Alligator Lizard	<i>Elgaria multicarinata</i>		PF
Western Blind Snake	<i>Leptotyphlops humilis</i>		PF
Rosy Boa	<i>Lichanura trivirgata</i>		IN (DFG)
Ringneck Snake	<i>Diadophis punctatus</i>		PF
Baja California Coachwhip	<i>Masticophis flagellum</i>		PF
Striped Racer	<i>Masticophis lateralis</i>		PF
W. Patch-nosed Snake	<i>Salvadora hexalepis</i>	SSC	PF
Gopher Snake	<i>Pituophis melanoleucus</i>		PF
Common Kingsnake	<i>Lampropeltis getula</i>		PF
Long-nosed Snake	<i>Rhinocheilus lecontei</i>		PF
Two-striped Garter Snake	<i>Thamnophis hammondi</i>	SSC	AS, PF
CA Black-headed Snake	<i>Tantilla planiceps</i>		PF

Red Diamond Rattlesnake	<i>Crotalus ruber ruber</i>	SSC	PF
Western Rattlesnake	<i>Crotalus viridis</i>		PF
AMPHIBIANS			
Common Name	Scientific Name	Status	Comments*
Garden Slender Salamander	<i>Batrachoseps major</i>		PF
Western Spadefoot	<i>Spea (Scaphiopus) hammondi</i>	SSC	AS, PF
Western Toad	<i>Bufo boreas</i>		AS,PF
Pacific Tree Frog	<i>Hyla regilla</i>		AS
Bullfrog	<i>Rana catesbeiana</i>	I	AS, PF
African Clawed Frog	<i>Xenopus laevis</i>	I	AS
FISHES			
Common Name	Scientific Name	Status	Comments*
Mosquito Fish	<i>Gambusia affinis</i>	I	AS
Green Sunfish	<i>Lepomis cyanellus</i>	I	AS
Bluegill	<i>Lepomis macrochirus</i>	I	AS
Largemouth Bass	<i>Micropterus salmoides</i>	I	AS
Black Crappie	<i>Pomoxis nigromaculatus</i>	I	AS
Black Bullhead	<i>Ameiurus melas</i>	I	AS
INVERTEBRATES			
Common Name	Scientific Name	Status	Comments*
Quino Checkerspot Butterfly	<i>Euphydryas editha quina</i>	FE	Focus surveys by USGS and DFG.
SENSITIVE PLANTS			
Common Name	Scientific Name	Status	Comments*
San Diego Thornmint	<i>Acanthomintha lilcifolia</i>	SE, FT, MSCP	RP
South Coast Saltscale	<i>Atriplex pacifica</i>		RP
Mesa Brodiaea	<i>Brodiaea holonensis</i>		RP
Small-flowered Morning-glory	<i>Convolvulus simulans</i>		RP
Annual Hairgrass	<i>Deschampsia danthonioides</i>		RP
Western Dichondra	<i>Dichondra occidentalis</i>		RP
Variegated Dudleya	<i>Dudleya variegata</i>	MSCP	RP
San Diego Barrel Cactus	<i>Ferocactus viridescens</i>	MSCP	RP
Chocolate Lily	<i>Fritilaria biflora</i>		RP
Palmer's Grapplinghook	<i>Harpagonella palmeri</i>		RP
Otay Tarplant	<i>Deinandra (Hemizonia) conjugens</i>	SE, FT, MSCP	RP

San Diego Marsh-elder	<i>Iva hayesiana</i>		RP
Southwestern Spiny Rush	<i>Juncus acutus ssp. Leopoldii</i>		RP
San Diego Goldenstar	<i>Muilla clevelandii</i>	MSCP	RP
Dot-seed Plantain	<i>Plantago erecta</i>		RP
Coulter's Matilija Poppy	<i>Romneya coulteri</i>		RP
Ashy Spike-moss	<i>Selaginella cinerascens</i>		RP
San Diego Sunflower	<i>Viguiera laciniata</i>		RP

*All records from "Baseline Biodiversity Survey for Rancho Jamul Ecological Reserve", USGS-BRD, 2002 except those marked (DFG), indicating Department of Fish and Game origin.

Status codes : SE-State endangered; FE-Federal endangered; FT-Federal threatened; FP-State fully protected; SSC-California Species of Special Concern; MSCP-MSCP covered species; I -Introduced.

Comments codes : AS-Aquatic Survey; BP-Bird Point Count Survey; BS-Bat Survey; IN-Incidental; NT-Night Time Bird Point Count Survey; PF-Pitfall Survey; RC-Remote Camera; RP-Rare Plant Survey; ST-Sherman Traps; TS-Track Station.

Rancho Jamul Ecological Reserve and Hollenbeck Canyon Wildlife Area

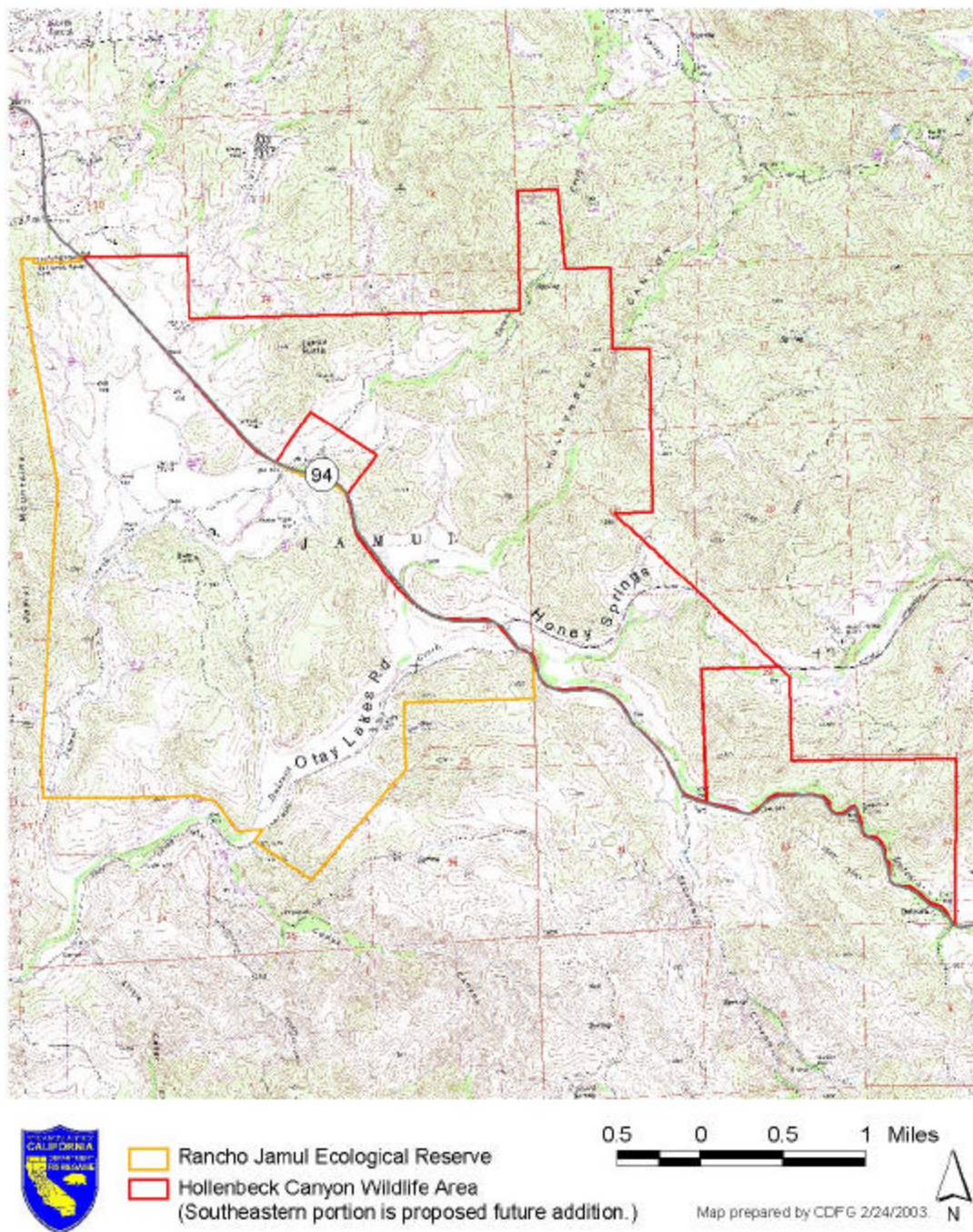


Figure 3: Map of Rancho Jamul Ecological Preserve

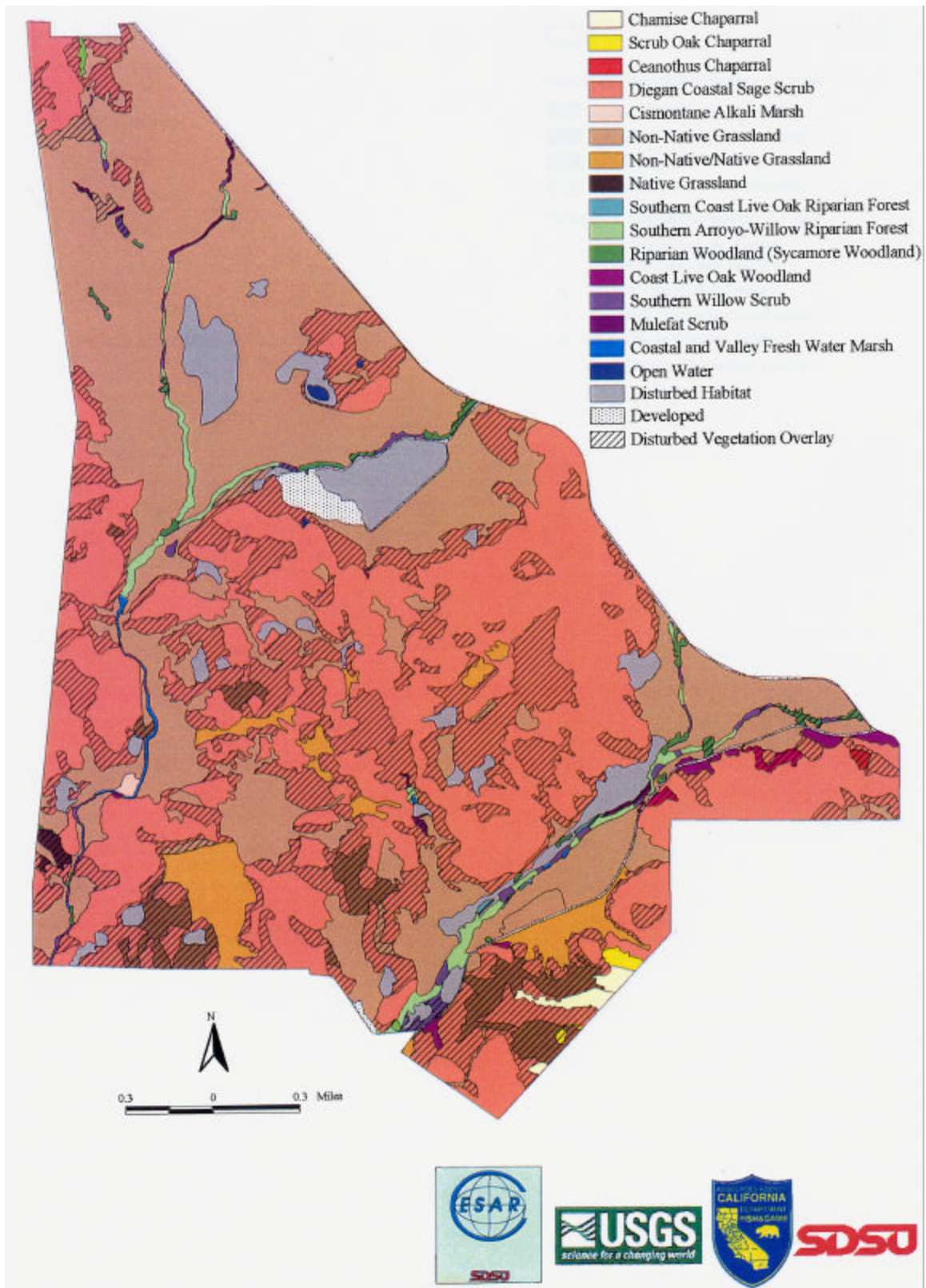


Figure 4. Rancho Jamul Ecological Reserve Vegetation Map

Crestridge Ecological Reserve

The Crestridge Ecological Reserve is located near the unincorporated community of Lakeside in southern San Diego County, immediately east of the City of El Cajon. The property, initially 2,377 acres, is situated between the small community of Crest to the south and Interstate 8 (I-8) to the north. This property has some small areas of past development or disturbance, but is primarily composed of relatively undisturbed southern mixed chaparral, coastal sage scrub, riparian woodland, oak woodland, and a small amount of annual grassland. Despite being surrounded by medium and low density development, the site supports many valuable biological and archeological resources. Besides the value of the habitats on-site, the property also serves an important connectivity function within the MSCP preserve system.



Figure 5: Crestridge Ecological Reserve

The property provides a terrestrial wildlife corridor to the east and north, linking natural lands south of I-8 to lands north of the freeway via Harbison and Chocolate Canyons. The western portion of the property supports some coastal sage scrub habitat, which is part of the important sage scrub corridor connecting habitats in the Dehesa/Sweetwater River area to the Lakeside Linkage, a critical series of sage scrub islands immediately north of I-8. The Lakeside Linkage is the only sage scrub corridor across I-8, and is very important to sustaining connectivity between California gnatcatcher populations, and other bird species, south of I-8 with those to the north. At the end of 2003, the Department received 261 acres of primarily coastal sage scrub habitat land which was added to the western portion of the reserve (bringing the total size of the reserve to 2,638

acres) (Figure 6). This land was transferred to the Department by the San Diego County Water Authority. This property was acquired by the Water Authority to mitigate impacts to sage scrub and the California gnatcatcher from its own development projects. It will be surveyed in 2004 by Department biologists to further assess its natural resources.

The reserve was established in 1999 when the property was purchased from The Nature Conservancy (TNC). TNC had acquired it from the Gatlin Corporation, with the understanding that the Department would in turn purchase the site from TNC. The Department had worked with Gatlin in 1995 to establish a conservation bank on the property, with the bank lands to eventually be given to the Department once all of the mitigation credits had been sold. However, a portion of the property had approval from the County of San Diego for residential development (Phase 2 of the conservation bank). When this development threatened to proceed, TNC and local community activists worked together with the Department to secure the acquisition of this potential development area, resulting in the eventual transfer of the entire property to the Department. TNC retains the rights to sell the remaining mitigation credits, and with each sale contributes money toward an endowment to manage the reserve. A draft management plan has been written for the Crestridge Ecological Reserve, and is expected to be released for public review and comment in 2003.

Resource Inventory

During 2000 and 2001 an initial resource inventory was conducted on the property by various consultants. Table 5 lists the wildlife species detected on-site; a current vegetation map of the property is shown in Figure 7. A detailed discussion of these surveys will be included in the management plan being produced. In 2002 SCR biologists began monitoring activities on the reserve. Twenty bird point count stations were monitored in May 2002 by the SCR. Thirty-eight bird species were detected during the surveys, with the most common species (in order of abundance) being: wren-tit, mourning dove, spotted towhee, Western scrub jay, black-headed grosbeak, house finch, lesser goldfinch, and cliff swallow. Additional interesting findings during the survey work included four observations of coast horned lizard, or horned lizard scat. All of these observations were made along existing dirt roads on-site, both on the western portion of the property, as well as the eastern portion. One horned lizard observation was of a juvenile. Also, evidence of mountain lion activity was noted in the form of scat left on a dirt road. The scat did not appear to be fresh.

Table 5. Wildlife Species Occurring on the Crestridge ER - 2001-2002

MAMMALS			
Common Name	Scientific Name	Status	Comments*
Virginia Opossum	<i>Didelphis virginiana</i>	I	
Audubon's (Desert) Cottontail	<i>Sylvilagus audubonii</i>		
California Ground Squirrel	<i>Spermophilus beecheyi</i>		
Botta's Pocket Gopher	<i>Thomomys bottae</i>		

Dusky-footed Woodrat	<i>Neotoma fuscipes</i>		
Coyote	<i>Canis latrans</i>		
Gray fox	<i>Urocyon cinereoargenteus</i>		
Raccoon	<i>Procyon lotor</i>		
Mountain Lion	<i>Felis concolor</i>	MSCP	Scat (DFG)
Bobcat	<i>Lynx rufus</i>		
Mule Deer	<i>Odocoileus hemionus</i>	MSCP	
BIRDS			
Common Name	Scientific Name	Status	Comments*
Turkey Vulture	<i>Cathartes aura</i>		
White-tailed Kite	<i>Elanus leucurus</i>	FP	
Northern Harrier	<i>Circus cyaneus</i>	SSC, MSCP	
Sharp-shinned Hawk	<i>Accipiter striatus</i>		
Cooper's Hawk	<i>Accipiter cooperii</i>	SSC, MSCP	
Red-shouldered Hawk	<i>Buteo lineatus</i>		
Red-tailed Hawk	<i>Buteo jamaicensis</i>		
Golden Eagle	<i>Aquila chrysaetos</i>	FP, MSCP	
American Kestrel	<i>Falco sparverius</i>		
California Quail	<i>Callipepla californica</i>		Observed (DFG)
Rock Dove	<i>Columba livia</i>	I	
Mourning Dove	<i>Zenaida macroura</i>		
Common Ground Dove	<i>Columbina passerina</i>		
Greater Roadrunner	<i>Geococcyx californianus</i>		
Barn Owl	<i>Tyto alba</i>		
Great Horned Owl	<i>Bubo virginianus</i>		
Common Poorwill	<i>Phalaenoptilus nuttallii</i>		
White-throated Swift	<i>Aeronautes saxatalis</i>		
Black-chinned Hummingbird	<i>Archilochus alexandri</i>		
Anna's Hummingbird	<i>Calypte anna</i>		
Costa's Hummingbird	<i>Calypte costae</i>		
Allen's Hummingbird	<i>Selasphorus sasin</i>		
Rufous Hummingbird	<i>Selasphorus rufus</i>		
Acorn Woodpecker	<i>Melanerpes formicivorus</i>		
Nuttall's Woodpecker	<i>Picoides nuttallii</i>		
Downy Woodpecker	<i>Picoides pubescens</i>		
Northern Flicker	<i>Colaptes auratus</i>		
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>		
Black Phoebe	<i>Sayornis nigricans</i>		
Say's Phoebe	<i>Sayornis saya</i>		
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>		
Cassin's Kingbird	<i>Tyrannus vociferans</i>		
Western Kingbird	<i>Tyrannus verticalis</i>		

Hutton's Vireo	<i>Vireo huttoni</i>		
Western Scrub Jay	<i>Aphelocoma californica</i>		
American Crow	<i>Corvus brachyrhynchos</i>		
Common Raven	<i>Corvus corax</i>		
N. Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>		
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>		
Barn Swallow	<i>Hirundo rustica</i>		
Oak Titmouse	<i>Baeolophus inornatus</i>		
Bushtit	<i>Psaltiriparus minimus</i>		
White-breasted Nuthatch	<i>Sitta carolinensis</i>		
Rock Wren	<i>Salpinctes obsoletus</i>		
Canyon Wren	<i>Catherpes mexicanus</i>		
Bewick's Wren	<i>Thryomanes bewickii</i>		
House Wren	<i>Troglodytes aedon</i>		
Ruby-crowned Kinglet	<i>Regulus calendula</i>		
Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>		
Western Bluebird	<i>Sialia mexicana</i>	MSCP	
Swainson's Thrush	<i>Catharus ustulatus</i>	SSC	Observed (DFG)
Hermit Thrush	<i>Catharus guttatus</i>		
American Robin	<i>Turdus migratorius</i>		
Wrentit	<i>Chamaea fasciata</i>		
Northern Mockingbird	<i>Mimus polyglottos</i>		
California Thrasher	<i>Toxostoma redivivum</i>		
American Pipit	<i>Anthus rubescens</i>		
Cedar Waxwing	<i>Bombycilla cedrorum</i>		
European Starling	<i>Sturnus vulgaris</i>	I	
Phainopepla	<i>Phainopepla nitens</i>		
Orange-crowned Warbler	<i>Vermivora celata</i>		
Yellow Warbler	<i>Dendroica petechia</i>	SSC	
Yellow-rumped Warbler	<i>Dendroica coronata</i>		
Townsend's Warbler	<i>Dendroica townsendi</i>		
MacGillivray's Warbler	<i>Oporornis tolmiei</i>		
Common Yellowthroat	<i>Geothlypis trichas</i>		
Wilson's Warbler	<i>Wilsonia pusilla</i>		
Spotted Towhee	<i>Pipilo maculatus</i>		
California Towhee	<i>Pipilo crissalis</i>		
So. Calif. Rufous-crowned Sparrow	<i>Aimophila ruficeps canescens</i>	SSC, MSCP	
Chipping Sparrow	<i>Spizella passerina</i>		
Black-chinned Sparrow	<i>Spizella atrogularis</i>		
Lark Sparrow	<i>Chondestes grammacus</i>		
Song Sparrow	<i>Melospiza melodia</i>		
Lincoln's Sparrow	<i>Melospiza lincolni</i>		
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>		
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>		
Fox Sparrow	<i>Passerella iliaca</i>		

Dark-eyed Junco	<i>Junco hyemalis</i>		
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>		
Blue Grosbeak	<i>Guiraca caerulea</i>		
Lazuli Bunting	<i>Passerina amoena</i>		
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>		
Brown-headed Cowbird	<i>Molothrus ater</i>		
Hooded Oriole	<i>Icterus cucullatus</i>		
Bullock's Oriole	<i>Icterus bullockii</i>		
House Finch	<i>Carpodacus mexicanus</i>		
Pine Siskin	<i>Carduelis pinus</i>		
Lesser Goldfinch	<i>Carduelis psaltria</i>		
Lawrence's Goldfinch	<i>Carduelis lawrencei</i>		
American Goldfinch	<i>Carduelis tristis</i>		
REPTILES			
Common Name	Scientific Name	Status	Comments *
Granite Spiny Lizard	<i>Sceloporus orcutti</i>		
Western Fence Lizard	<i>Sceloporus occidentalis</i>		
Side-blotched Lizard	<i>Uta stansburiana</i>		
Coast Horned Lizard	<i>Phrynosoma coronatum</i>	SSC, MSCP	
Orange-throated Whiptail	<i>Cnemidophorus hyperythrus</i>	SSC, MSCP	
Western Whiptail	<i>Cnemidophorus tigris</i>		
Southern Alligator Lizard	<i>Elgaria multicarinata</i>		
Rosy Boa	<i>Lichanura trivirgata</i>		
Night Snake	<i>Hypsiglena torquata</i>		
Common Kingsnake	<i>Lampropeltis getulus californiae</i>		
Striped Racer	<i>Masticophis lateralis</i>		
Two-striped Garter Snake	<i>Thamnophis hammondi</i>	SSC	
Western Rattlesnake	<i>Crotalus viridis</i>		
AMPHIBIANS			
Common Name	Scientific Name	Status	Comments *
Pacific Tree Frog	<i>Hyla regilla</i>		
Slender Salamander	<i>Batrachoseps pacificus</i>		Observed (DFG)
INVERTEBRATES			
Common Name	Scientific Name	Status	Comments *
Mayfly	<i>Callibaetis</i> sp.		
Blue Damselfly	<i>Enallagma</i> sp.		
Pacific Spiketail	<i>Cordulegaster dorsalis</i>		
Flame Skimmer	<i>Libellula saturata</i>		
Neon Skimmer	<i>Libellula croceipennis</i>		

Blue-Eyed Darner	<i>Aeshna multicolor</i>		
Orange Pallid Band-Wing Grasshopper	<i>Arphia conspersa</i>		
Pallid-Winged Grasshopper	<i>Trimerotropis allidipennis</i>		
Broad-Winged Katydid	<i>Microcentrum rhombifolium</i>		
S. CA Chaparral Camel Cricket	<i>Gammarotettix genitilis</i>		
Tree Cricket	<i>Oecanthus sp.</i>		
Field Cricket	<i>Gryllus sp.</i>		
Plant Bug sp.	Genus <i>Miridae</i>		
Lace Bug	Family <i>Tingidae</i>		
Bee Assassin	<i>Apiomerus crassipes</i>		
Western Cone-Nose	<i>Triatoma protracta</i>		
Common Milkweed Bug	<i>Lygaeus kalmii</i>		
Large Milkweed Bug	<i>Oncopeltus fasciatus</i>		
Cicada	Family <i>Cicadidae</i>		
Red-Winged Grass Cicada	<i>Tibicinoides upreosparus</i>		
Wide-Headed Cicada	<i>Platypedia laticapitata</i>		
Spittle Bug	Family <i>Cercopidae</i>		
Leafhopper	Family <i>Cicadellidae</i>		
Tree Hopper	Family <i>Membracidae</i>		
Red-Gum Tree Psyllid	Family <i>Psyllidae</i>		
Green Lacewing	Family <i>Chrysopidae</i>		
Antlion	Family <i>Myrmeleontidae</i>		
Microlep Moth	<i>Chionodes ochreostrigella</i>		
Microlep Moth	<i>Amydria sp.</i>		
Microlep Moth	<i>Melisopus latiferreanus</i>		
White-Lined Spinx Moth	<i>Hyles lineata</i>		
Corn Earworm	<i>Helicoverpa zea</i>		
Black Cutworm	<i>Agrotis ipsilon</i>		
Army Cutworm	<i>Euxoa auxiliaris</i>		
Snout Moth	Family <i>Pyrilidae</i>		
Snout Moth	<i>Hellula rogatalis</i>		
Snout Moth	<i>Jocara trabalis</i>		
Large Tolyte	<i>Toyte velleda</i>		
Tiger Moth sp.	Family <i>Arctiidae</i>		
Spotted Halisidota	<i>Halisidota maculata</i>		
Cabbage Looper	<i>Trichoplusia ni</i>		
Alfalfa Looper	<i>Autographa californica</i>		
Underwing Moth	<i>Catocala sp.</i>		
Omnivorous Looper	<i>Sabulodes aegrotata</i>		
Geometrid Moth	Family <i>Geometridae</i>		
Geometrid Moth	<i>Glaucina sp.</i>		
Geometrid Moth	<i>Semiothisa neptaria</i>		
Anise Swallowtail	<i>Papilio zelicaon</i>		
Western Tiger Swallowtail	<i>Papilio rutulus</i>		

Pale Swallowtail	<i>Papilio eurymedon</i>		
Checkered White	<i>Pontia protodice</i>		
Cabbage White	<i>Pieris rapae</i>		
Pacific Sara Orange-Tip	<i>Anthocharis sara sara</i>		
Desert Orange-Tip	<i>Anthocharis cethura</i>		
Orange Sulphur	<i>Colias eurytheme</i>		
Sleepy Orange	<i>Eurema nicippe</i>		
Dainty Sulphur	<i>Nathalis iole</i>		
Hermes Copper	<i>Lycaena hermes</i>	SA	San Diego Co. endemic. See comments below.
Sylvan Hairstreak	<i>Satyrium sylvinus</i>		
Gold-Hunter's Hairstreak	<i>Satyrium auretteum spadix</i>		
Mt. Mahogany Hairstreak	<i>Satyrium tetra</i>		
Hedgerow Hairstreak	<i>Satyrium saepium</i>		
Bramble Hairstreak	<i>Callophrys dumetorum perplexing</i>		
Brown Elfin	<i>Callophrys augustinus</i>		
Gray Hairstreak	<i>Strymon melinus</i>		
Marine Blue	<i>Leptotes marina</i>		
Edward's Blue	<i>Hemiargus ceraunus gyas</i>		
Reakirt's Blue	<i>Hemiargus isola alce</i>		
Bernardino Blue	<i>Euphilotes batoides bernardino</i>		
Acmon Blue	<i>Plebejus acmon acmon</i>		
Southern Blue	<i>Glaucopsyche lygadamus australis</i>		
Behr's Metalmark	<i>Apodemia mormo virgulti</i>		
Gulf Fritillary	<i>Agraulis vanillae</i>		
Semiramis Fritillary	<i>Speyeria coronis semiramis</i>		
Comstock's Fritillary	<i>Speyeria callippe comstocki</i>		
Gabb's Checkerspot	<i>Chlosyne gabbii</i>		
Mourning Cloak	<i>Nymphalis antiopa</i>		
Painted Lady	<i>Vanessa cardui</i>		
West Coast Lady	<i>Vanessa annabella</i>		
Common Buckeye	<i>Junonia coenia</i>		
California Sister	<i>Adelpha bredowii</i>		
California Ringlet	<i>Coenonympha californica</i>		
Queen	<i>Danaus gillippus</i>		
Mournful Duskywing	<i>Erynnis tristis</i>		
Funereal Duskywing	<i>Erynnis funeralis</i>		
Harbison's Dun Skipper	<i>Pyrgus albescens</i>		
Western Checkered Skipper	<i>Euphyes vestris harbisoni</i>		
Fiery Skipper	<i>Hylephila phyleus</i>		
Rural Skipper	<i>Ochlodes agricola</i>		
Common Crane fly	<i>Holorusia hespera</i>		
Mosquito sp.	Family Culicidae		

Black (Buffalo) Fly sp.	Family <i>Simuliidae</i>		
Snipe Fly	Family <i>Rhagionidae</i>		
March Fly	Family <i>Bibionidae</i>		
Robber Fly	Family <i>Asilidae</i>		
Long-Legged Fly	Family <i>Dolichopodidae</i>		
Muscid Fly	Family <i>Muscidae</i>		
Bee Fly	<i>Bombylius albicapillus</i>		
Large Bee Fly	<i>Bombylius major</i>		
Bee Fly	<i>Bombylius lancifer</i>		
Bee Fly	<i>Conophorus fenestratus</i>		
Bee Fly	<i>Exoprosopa</i> sp.		
Black-Winged Bee Fly	<i>Hemipenthes sinuosa</i> <i>jaennickiana</i>		
Bee Fly	<i>Lepidanthrax</i> sp.		
Tachinid Fly	<i>Archytas apicifer</i>		
Syrphid Flower Fly sp.	Family <i>Syrphidae</i>		
Flesh Fly sp.	<i>Parasarcophaga</i> sp.		
Lauxaniidae Fly	<i>Trigonometopus</i> sp.		
Green Bottle Fly	<i>Phaenicia sericata</i>		
Blue Bottle Fly	<i>Calliphora/Paralucilia</i> sp		
Melolonthinae Scarab Beetle	<i>Serica</i> sp.		
Scarab Beetle	<i>Cremastocheilus schaumii</i>		
Bear Beetle	<i>Paracotalpa ursina</i>		
Click Beetle	Family <i>Elateridae</i>		
Checkered Beetle	<i>Trichodes</i> sp.		
Convergent Lady Beetle	<i>Hippodamia convergens</i>		
Nine-Spotted Ladybird	<i>Coccinella novemnotata</i>		
Ash Gray Ladybird	<i>Olla v-nigrum</i>		
Shining Flower Beetle	Family <i>Phalacridae</i>		
Ironclad Beetle	<i>Phloeodes pustulosus</i>		
Blister Beetle sp.	<i>Meloidae zonitis</i>		
Blister Beetle sp.	<i>Lytta</i> sp.		
Stink Beetle	<i>Eleodes</i> sp.		
Wooly Darkling Beetle	<i>Cratidus osculans</i>		
Green Fruit Beetle	<i>Cotinus mutabilis</i>		
Carpet Beetle	<i>Attagenus</i> sp.		
Carpet Beetle	<i>Anthrenus</i> sp.		
Tumbling Flower Beetle	<i>Mordella atrata</i>		
Knaus' Saxinis	<i>Saxinis knausi</i>		
Yucca Weevil	<i>Scyphorus yuccae</i>		
Argentine Ant	<i>Iridomyrmex humilis</i>		
California Harvester Ant	<i>Pogonomyrmex californicus</i>		
Honey Ant	<i>Myrmecocystus melliger</i>		
Formicid Ant	Family <i>Formicidae</i>		
Velvety Tree Ant	<i>Liometopum occidentale</i>		

Yellow Jacket	<i>Vespula pensylvanica</i>		
Polistes Wasp	<i>Polistes</i> sp.		
Golden Polistes Wasp	<i>Polistes fuscatus aurifer</i>		
Sphecic Wasp	Family <i>Sphecidae</i>		
Blue Mud Wasp	<i>Chalybion californicum</i>		
Tarantula Wasp	<i>Pepsis</i> sp.		
Gall Wasp	Family <i>Cynipidae</i>		
Scrub Oak Gall Wasp	<i>Andricus/Disholcaspis</i> sp.		
Parasitic Scrub Oak Gall Wasp	Family <i>Torymidae</i>		
Wood Wasp	<i>Sirex aureolatus</i>		
Plasterer Bee	Subfamily <i>Colletinae</i>		
Sweat Bee	Family <i>Halictidae</i>		
Mining Bee	Subfamily <i>Andreninae</i>		
Digger Bee	Subfamily <i>Anthophorinae</i>		
Valley Carpenter Bee	<i>Xylocopa varipuncta</i>		
California Carpenter Bee	<i>Xylocopa californica</i>		
Carpenter Bee	<i>Ceratina</i> sp.		
Vosnesenski's Bumblebee	<i>Bombus vosnesenskii</i>		
Edward's Bumblebee	<i>Bombus edwardsi</i>		
Crotch's Bumblebee	<i>Bombus crotchii</i>		
European Honeybee	<i>Apis mellifera</i>		
Tarantula	<i>Aphonopelmus</i> sp.		
Wolf Spider sp.	<i>Lycosa</i> sp.		
Funnel Spider	<i>Agelenopsis operta</i>		
Trash-Web Spider	<i>Cyclosa turbinata</i>		
Jumping Spider	Family <i>Salticidae</i>		
Red Jumping Spider	<i>Phidippus formisus</i>		
Crab Spider	Family <i>Thomisidae</i>		
Spider Mite	Family <i>Tetranychidae</i>		
Brown Dog Tick	<i>Rhipicephalus sanguineus</i>		
Brown Garden Snail	<i>Helix aspera</i>		

* All records from "Habitat Management and Monitoring Plan for the Crestridge Ecological Reserve", Conservation Biology Institute, February 2002 except those marked "DFG", indicating of Department of Fish and Game staff origin.

Status codes : SE-State endangered; FE-Federal endangered; FT-Federal threatened; FP-State fully protected; SSC-California Species of Special Concern; SA-"Special Animal" DFG designation; MSCP-MSCP covered species; I-Introduced.

Additional comments: Surveys were conducted for the Hermes Copper butterfly (*Hermelycaena hermes*) in areas known to support this species in past years. Due to drought conditions only three individuals were observed in the spring and summer, a significant decline from past years. In addition, a survey in late May of 2002 of the San Diego thornmint (*Acanthomintha ilicifolia*) population on the slopes above Rios Canyon (i.e., Thornmint Hill) indicated that no thornmint flowered in 2002. Again, severe

drought is assumed to be the cause, since a similar lack of thornmint flowering occurred on the Hollenbeck Canyon Wildlife Area in 2002 as well.

Management Plan

A draft management plan for the Crestridge ER is near completion. It is anticipated that the draft plan will be circulated for public review and comment in 2003. Public comments will be received through the CEQA process, and incorporated into the final management plan where appropriate.

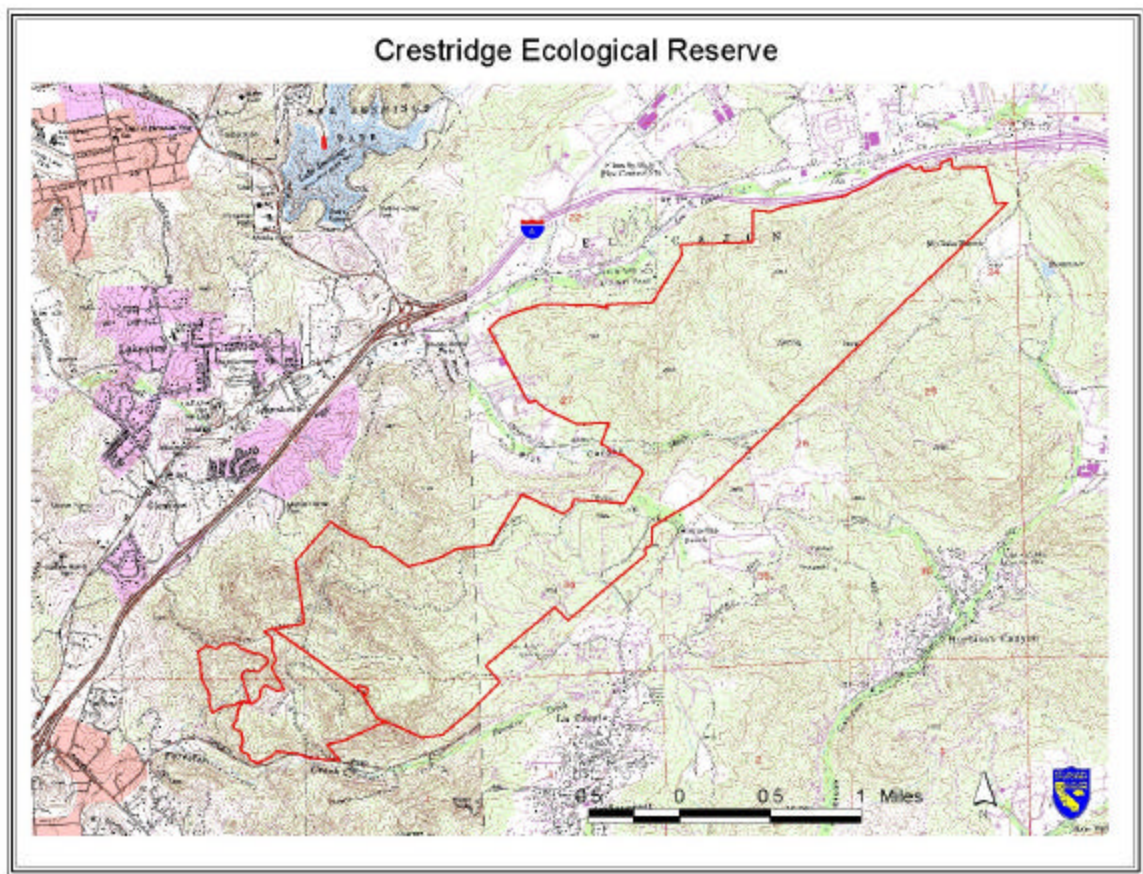


Figure 6. Map of Crestridge Ecological Reserve

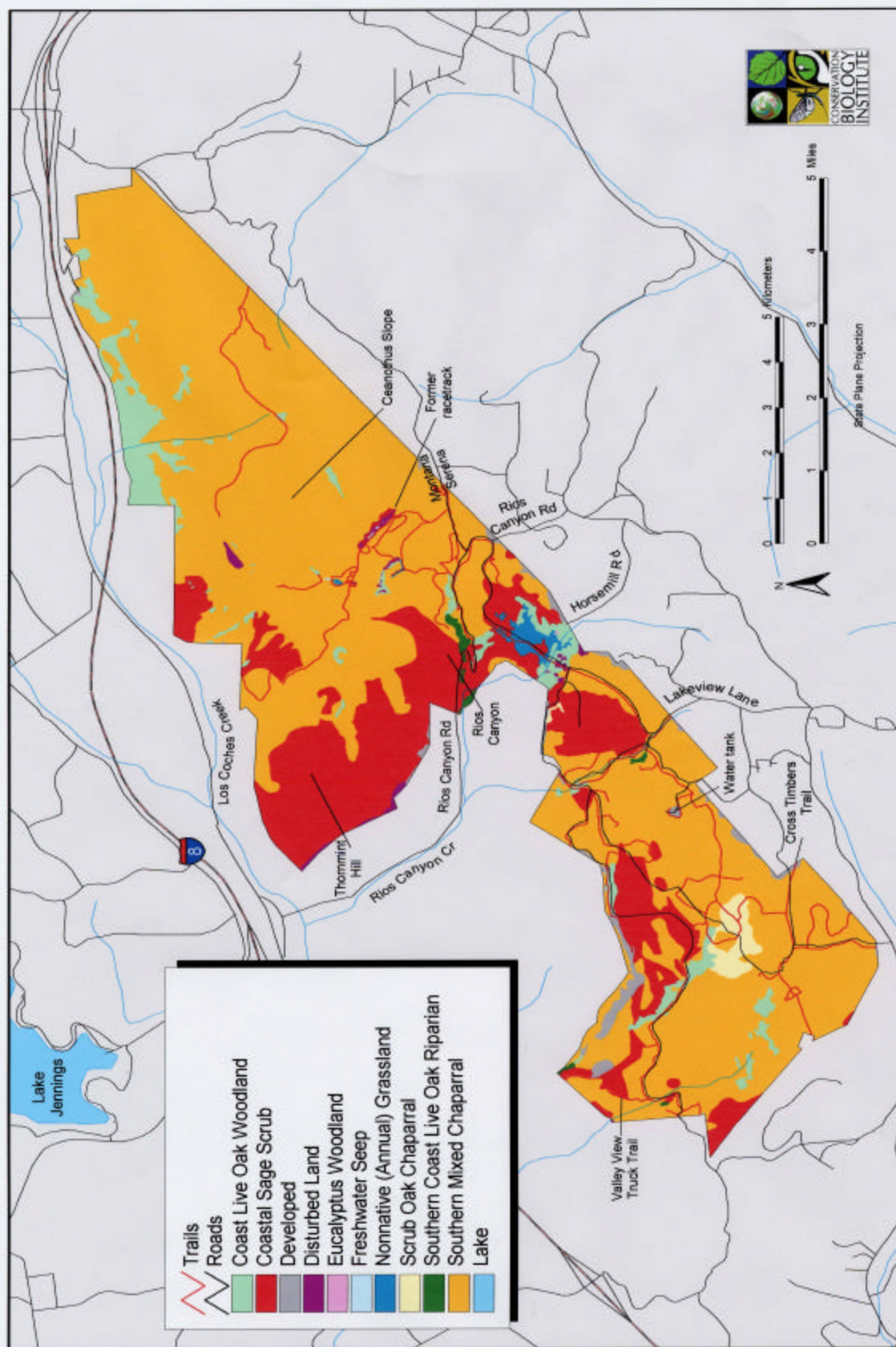


Figure 3-1. Vegetation Communities of Crestridge Ecological Reserve

3-3

Figure 7. Vegetation Communities of Crestridge Ecological Reserve

Boden Canyon Ecological Reserve

Boden Canyon Ecological Reserve (BCER) was acquired by the California Department of Fish and Game in the mid 1990's. The property is located approximately nine miles east of Escondido, San Diego County (USGS map coordinates, map). The State owned portion of Boden Canyon represents 1,211 acres of the 2,068 conserved acres within the canyon. The remainder of the property is owned by the City and County of San Diego. The habitat is largely oak woodland and riparian surrounded by southern mixed chaparral. A single man-made pond, located on State property, is present within a natural drainage that runs the length of the canyon. Currently, the Department allows the following uses on the State owned portion of the property: hiking and hunting (upland game bird only). Access gates are located off Highway 78, off Orosco Ridge road and through private land holdings at the northern border of the property. Kiosks with maps and information regarding property boundaries, uses and regulations are available at all three access gates. A single fire management road spans the length of the property.



Figure 8. Boden Canyon Ecological Reserve

Baseline Resource Inventory

A baseline resource inventory was conducted on the property from 2000-2001 by Merkel and Associates in conjunction with the preparation of the Boden Canyon Management Plan. At that time, surveys were conducted to determine which groups of wildlife were utilizing the Boden Canyon property. Surveys included: bird point counts, mammal tracking, herpetological surveys and vegetation mapping. For a detailed discussion of the

surveys conducted by Merkel and Associates on BCER, please refer to the Department report. Table 6 lists species detected by SCR biologists during 2001-2002.

Table 6. Wildlife Species occurring in the Boden Canyon Ecological Reserve, 2001-2002

MAMMALS			
Common Name	Scientific Name	Status	Comments*
Desert Cottontail	<i>Sylvilagus audubonii</i>		1 individual seen.
Woodrat sp.	<i>Neotoma sp.</i>		Scat and large nest noted.
Coyote	<i>Canis latrans</i>		Scat
Bobcat	<i>Lynx rufus</i>		Scat
BIRDS			
Common Name	Scientific Name	Status	Comments*
Great Blue Heron	<i>Ardea herodias</i>		Seen March '01 at pond
Turkey Vulture	<i>Cathartes aura</i>		
Mallard	<i>Anas platyrhynchos</i>		Seen March '01 at pond
Cinnamon Teal	<i>Anas cyanoptera</i>		Seen March '01 at pond
Ring-necked Duck	<i>Aythya collaris</i>		Seen March '01 at pond
Red-tailed Hawk	<i>Buteo jamaicensis</i>		.
Red-shouldered Hawk	<i>Buteo lineatus</i>		
Wild Turkey	<i>Meleagris gallopavo</i>	I	
California Quail	<i>Callipepla californica</i>		
American Coot	<i>Fulica americana</i>		Seen March '01 at pond.
Solitary Sandpiper	<i>Tringa solitaria</i>		Seen 8/16/01
Lesser Yellowlegs	<i>Tringa flavipes</i>		Seen March '01 at pond.
Mourning Dove	<i>Zenaida macroura</i>		
Vaux's Swift	<i>Chaetura vauxi</i>		
White-throated Swift	<i>Aeronautes saxatalis</i>		Seen March '01 at pond.
Anna's Hummingbird	<i>Calypte anna</i>		Seen March '01 at pond.
Costa's Hummingbird	<i>Calypte costae</i>		
Acorn Woodpecker	<i>Melanerpes formicivorus</i>		
Nuttall's Woodpecker	<i>Picoides nuttallii</i>		.
Northern Flicker	<i>Colaptes auratus</i>		
Olive-sided Flycatcher	<i>Contopus cooperi</i>	SSC	
Western Wood-pewee	<i>Contopus sordidulus</i>		
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>		
Black Phoebe	<i>Sayornis nigricans</i>		
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>		
Cassin's Kingbird	<i>Tyrannus vociferans</i>		
Western Kingbird	<i>Tyrannus verticalis</i>		
Least Bell's Vireo	<i>Vireo bellii pusillus</i>	FE,SE, MSCP	One singing ? noted just N. of pond. Migrant?
Hutton's Vireo	<i>Vireo huttoni</i>		
Warbling Vireo	<i>Vireo gilvus</i>		

Western Scrub Jay	<i>Aphelocoma californica</i>		
American Crow	<i>Corvus brachyrhynchos</i>		
Common Raven	<i>Corvus corax</i>		
N. Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>		Seen in March '01.
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>		
Barn Swallow	<i>Hirundo rustica</i>		
Oak Titmouse	<i>Baeolophus inornatus</i>		
Bushtit	<i>Psaltiriparus minimus</i>		
Canyon Wren	<i>Catherpes mexicanus</i>		
Bewick's Wren	<i>Thryomanes bewickii</i>		
House Wren	<i>Troglodytes aedon</i>		
Blue-gray Gnatcatcher	<i>Polioptila caerulea</i>		
American Robin	<i>Turdus migratorius</i>		Seen March '01.
Wrentit	<i>Chamaea fasciata</i>		
California Thrasher	<i>Toxostoma redivivum</i>		
European Starling	<i>Sturnus vulgaris</i>	I	
Cedar Waxwing	<i>Bombycilla cedrorum</i>		Seen March '01.
Orange-crowned Warbler	<i>Vermivora celata</i>		
Yellow Warbler	<i>Dendroica petechia</i>	SSC	
Yellow-rumped Warbler	<i>Dendroica coronata</i>		Seen March '01.
Common Yellowthroat	<i>Geothlypis trichas</i>		
Western Tanager	<i>Piranga ludoviciana</i>		
Spotted Towhee	<i>Pipilo maculatus</i>		
California Towhee	<i>Pipilo crissalis</i>		
So. Calif. Rufous-crowned Sparrow	<i>Aimophila ruficeps canescens</i>	SSC, MSCP	
Black-chinned Sparrow	<i>Spizella atrogularis</i>		
Lark Sparrow	<i>Chondestes grammacus</i>		Prob. nest in grass under oaks at lake in 2002.
Song Sparrow	<i>Melospiza melodia</i>		
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>		Seen in March '01.
Dark-eyed Junco	<i>Junco hyemalis</i>		
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>		
Blue Grosbeak	<i>Guiraca caerulea</i>		
Lazuli Bunting	<i>Passerina amoena</i>		
Blackbird sp.			
Red-winged Blackbird	<i>Agelaius phoeniceus</i>		
Tricolored Blackbird	<i>Agelaius tricolor</i>	SSC, MSCP	
Brown-headed Cowbird	<i>Molothrus ater</i>		
Hooded Oriole	<i>Icterus cucullatus</i>		
Bullock's Oriole	<i>Icterus bullockii</i>		
House Finch	<i>Carpodacus mexicanus</i>		
Lesser Goldfinch	<i>Carduelis psaltria</i>		

REPTILES			
Common Name	Scientific Name	Status	Comments*
Orange-throated Whiptail	<i>Cnemidophorus hyperythrus</i>	SSC, MSCP	Captured in array
Western Whiptail	<i>C. tigris multiscutatus</i>		Captured in array
Western Skink	<i>Eumeces skiltonianus</i>		Captured near pond
Coast Horned Lizard	<i>Phrynosoma coronatum</i>	SSC, MSCP	Captured in array
Western Fence Lizard	<i>Sceloporus occidentalis</i>		Captured in array
Granite Spiny Lizard	<i>S. orcutti</i>		Captured near burn area
Side-blotched Lizard	<i>Uta stansburiana</i>		Captured in array
Rosy Boa	<i>Lichanura trivirgata</i>		Seen on main road
Gopher Snake	<i>Pituophis melanoleucus</i>		Road kill near pond
Two-striped Garter Snake	<i>Thamnophis hammondi</i>	SSC	Seen at S.Y.C. road cross
W. Patch-nosed Snake	<i>Salvadora hexalepis</i>		Observed on road
California Kingsnake	<i>Lampropeltis getula</i>		Killed at pond during fire
AMPHIBIANS			
Common Name	Scientific Name	Status	Comments*
Western Toad	<i>Bufo boreas</i>		Captured in array
Arroyo Toad	<i>Bufo californicus</i>	FE	Seen on Orosco Road
Pacific Treefrog	<i>Hyla regilla</i>		Observed at pond
Bullfrog	<i>Rana catesbeiana</i>	I	Captured at pool
<p>*All records from Department of Fish and Game biologists. Numbers refer to maximums per visit.</p> <p>Status Codes: FE-Federal endangered; SE-State endangered; SSC-California Species of Special Concern; MSCP-MSCP "covered" species; I = Introduced.</p>			

Boden Canyon Ecological Reserve

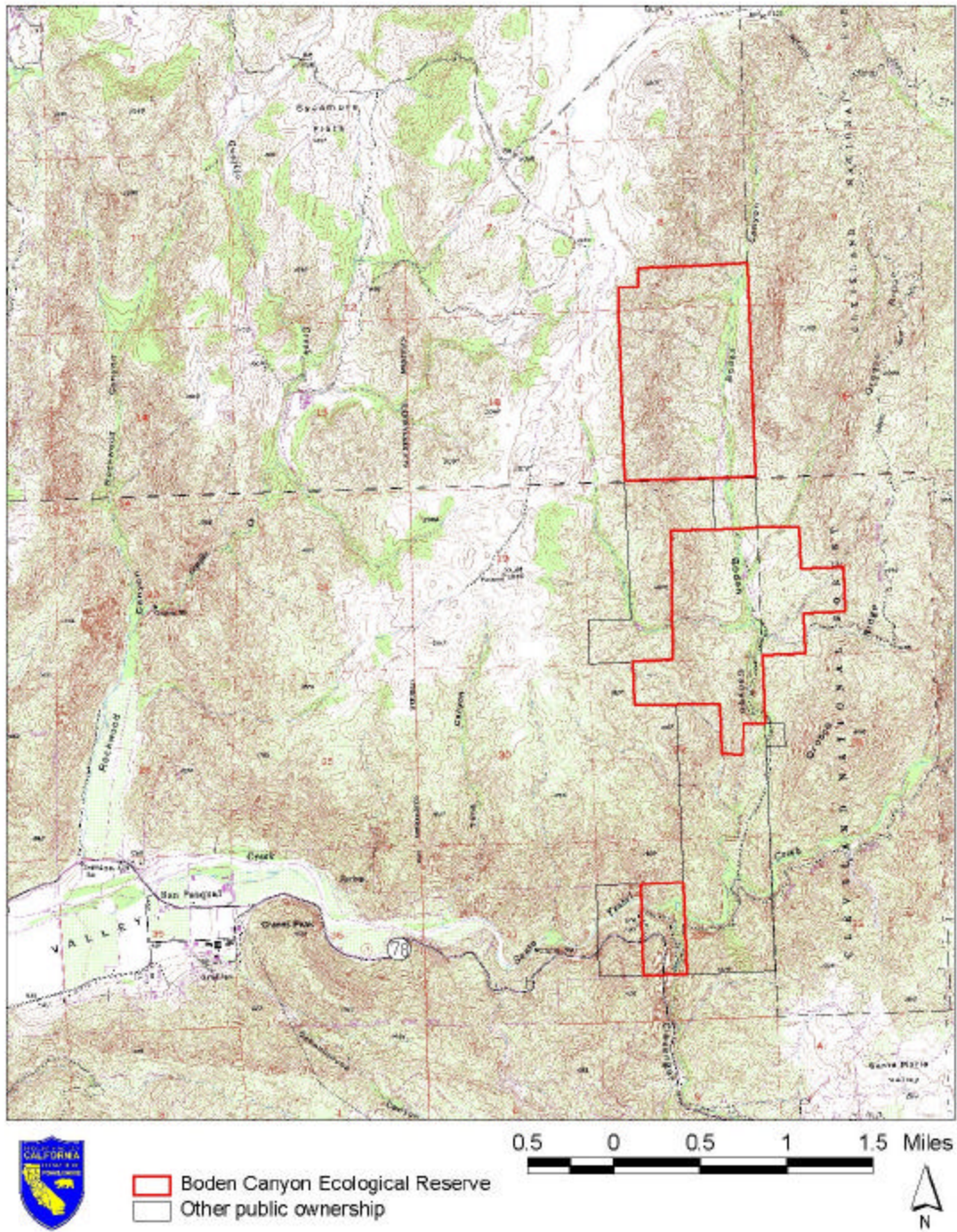


Figure 9. Map of Boden Canyon Ecological Reserve

Otay Mountain Ecological Reserve

The Otay Mountain Ecological Reserve is a 480-acre property located on the north-facing slopes of Otay Mountain, San Diego County. The property overlooks the Lower Otay Reservoir, owned by the City of San Diego, to the south. Much of the land surrounding this reserve is owned and managed by the Bureau of Land Management, although some private land that is a part of the Otay Ranch development abuts the property to the south. This reserve was purchased by the Department in 1996 to conserve its habitat values and a number of sensitive species. This property is also part of the largest biological core area within the Multiple Species Conservation Plan, a NCCP plan within southern San Diego County. Before the Department acquisition, this property had been subdivided into 40-acre lots, and a large dirt road from the south had been constructed to access the property. Additional smaller disturbances were created during this time to conduct soils tests on each lot. Uncontrolled fire has had a significant effect upon the property, as well as surrounding properties. One or more fires swept through the site in the middle-late 1990s, and the vegetation on-site has still not fully recovered. Regional drought conditions have added to this slow recovery time.



Figure 10. Otay Mountain Ecological Reserve

Resource Inventory

A biological survey was conducted on the property in 1995, before the Department acquired the site. That survey identified relatively undisturbed coastal sage scrub, southern mixed chaparral, and Tecate cypress forest as the dominant vegetation communities present. The survey also identified sensitive species locations. Of particular importance was the presence of the federally-threatened California gnatcatcher, with an estimated five to six pairs within the sage scrub vegetation. Other sensitive species noted include: Tecate cypress (*Cupressus forbesii*), Cleveland goldstar (*Muilla clevelandii*), variegated dudleya (*Dudleya variegata*), and Southern California rufous-crowned sparrow (*Aimophila ruficeps*).

In 2002, a general walk-over survey was conducted to assess species presence and vegetation recovery. Table 7 lists the species detected. Of particular note, one Thorne's hairstreak butterfly (*Mitoura thornei*) was observed in the one small patch of mature Tecate cypress trees, near the abandoned orchard, that escaped the earlier fire. Almost all of the Tecate cypress forest was burned in this last fire in 1996, and small cypress saplings are all that are currently present on the rest of the property. Southern California rufous-crowned sparrows have re-established themselves in the recovering coastal sage scrub habitat. These areas are dominated by deerweed (*Lotus scoparius*), as well as scattered sage scrub species still in the early stage of recovery. Fresh mountain lion (*Felis concolor*) scat was also found on the main dirt road through the property. No California gnatcatchers were observed on the property. Extensive searches were conducted where pre-fire records had indicated that this species was present. The condition of the sage scrub habitat did not appear sufficiently mature to support this species.

Research

In 2002, a small scale research program was begun to assess the relationship between recovery of coastal sage scrub habitat from fire and the re-establishment of the California gnatcatcher. Six 25-meter transects were located at sites where California gnatcatchers were present before the last fire occurred on the reserve. Along each transect, point intercept vegetation data was collected at every half meter interval using a thin metal rod dropped perpendicular to the transect. Data were collected for shrubs, grasses, herbaceous plants, litter and bare ground. The research question being asked is at what point of coastal sage scrub recovery from fire does the California gnatcatcher recolonize a burned site? Vegetation monitoring is done in concert with surveys for the gnatcatcher.

Table 7. Wildlife Species occurring in Otay Mountain Ecological Reserve, 2002

MAMMALS			
Common Name	Scientific Name	Status	Comments*
Audubon's (Desert) Cottontail	<i>Sylvilagus audubonii</i>		1 individual seen; scat throughout.
Black-tailed Jackrabbit	<i>Lepus californicus</i>	SSC, MSCP	Scat
California Ground Squirrel	<i>Spermophilus beecheyi</i>		Burrows
Botta's Pocket Gopher	<i>Thomomys bottae</i>		Mounds
Coyote	<i>Canis latrans</i>		Scat
Gray fox	<i>Urocyon cinereoargenteus</i>		Scat
Mountain Lion	<i>Puma concolor</i>	MSCP	Scat (one old, one fairly fresh).
Bobcat	<i>Lynx rufus</i>		Scat.
Mule Deer	<i>Odocoileus hemionus</i>	MSCP	2 individuals plus pellets.
BIRDS			
Common Name	Scientific Name	Status	Comments*
Red-tailed Hawk	<i>Buteo jamaicensis</i>		1
Greater Roadrunner	<i>Geococcyx californianus</i>		Heard
Anna's Hummingbird	<i>Calypte anna</i>		2
Allen's/Rufous Hummingbird	<i>Selasphorus sp.</i>		1
Northern Flicker	<i>Colaptes auratus</i>		1
Black Phoebe	<i>Sayornis nigricans</i>		3
Loggerhead Shrike	<i>Lanius ludovicianus</i>	SSC	1
Western Scrub Jay	<i>Apelocoma californica</i>		2
Common Raven	<i>Corvus corax</i>		5
Horned Lark	<i>Eremophila alpestris</i>		10
Bushtit	<i>Psaltirparus minimus</i>		5
Rock Wren	<i>Salpinctes obsoletus</i>		2
Hermit Thrush	<i>Catharus guttatus</i>		2
Wrentit	<i>Chamaea fasciata</i>		2 heard
California Thrasher	<i>Toxostoma redivivum</i>		1
Orange-crowned Warbler	<i>Vermivora celata</i>		2
Yellow-rumped Warbler	<i>Dendroica coronata</i>		20
Spotted Towhee	<i>Pipilo maculates</i>		5
California Towhee	<i>Pipilo crissalis</i>		10
So. Calif. Rufous-crowned Sparrow	<i>Aimophila ruficeps</i>	SSC, MSCP	10
Lark Sparrow	<i>Chondestes grammacus</i>		25
Chipping Sparrow	<i>Spizella passerina</i>		1
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>		1
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>		1
Western Meadowlark	<i>Sturnella neglecta</i>		15
Lesser Goldfinch	<i>Carduelis psaltria</i>		10

REPTILES			
Common Name	Scientific Name	Status	Comments*
Granite Spiny Lizard	<i>Sceloporus orcutti</i>		2
Western Fence Lizard	<i>Sceloporus occidentalis</i>		3+
Side-blotched Lizard	<i>Uta stansburiana</i>		1
INVERTEBRATES			
Common Name	Scientific Name	Status	Comments*
Pacific (Sara) Orangetip	<i>Anthocharis sara sara</i>		
Perplexing (Green) Hairstreak	<i>Callophrys dumetorum affinis</i>		
Brown Elfin	<i>Callophrys augustinus</i>		
Thorne's Hairstreak	<i>Mitoura thornei</i>		1 collected. Found in Tecate Cypress stand adjacent to the olive grove; large cypress still extant here.
Southern Blue	<i>Glaucopsyche lygdamus australis</i>		
Behr's Metalmark	<i>Apodemia mormo virgulti</i>		
Gabb's Checkerspot	<i>Chlosyne gabbii</i>		
California (Common) Ringlet	<i>Coenonympha tullia</i>		

* All records from Department of Fish and Game biologists. Numbers refer to maximums detected per visit.

Status Codes: SSC-California Species of Special Concern; MSCP-MSCP covered species

Otay Mountain Ecological Reserve

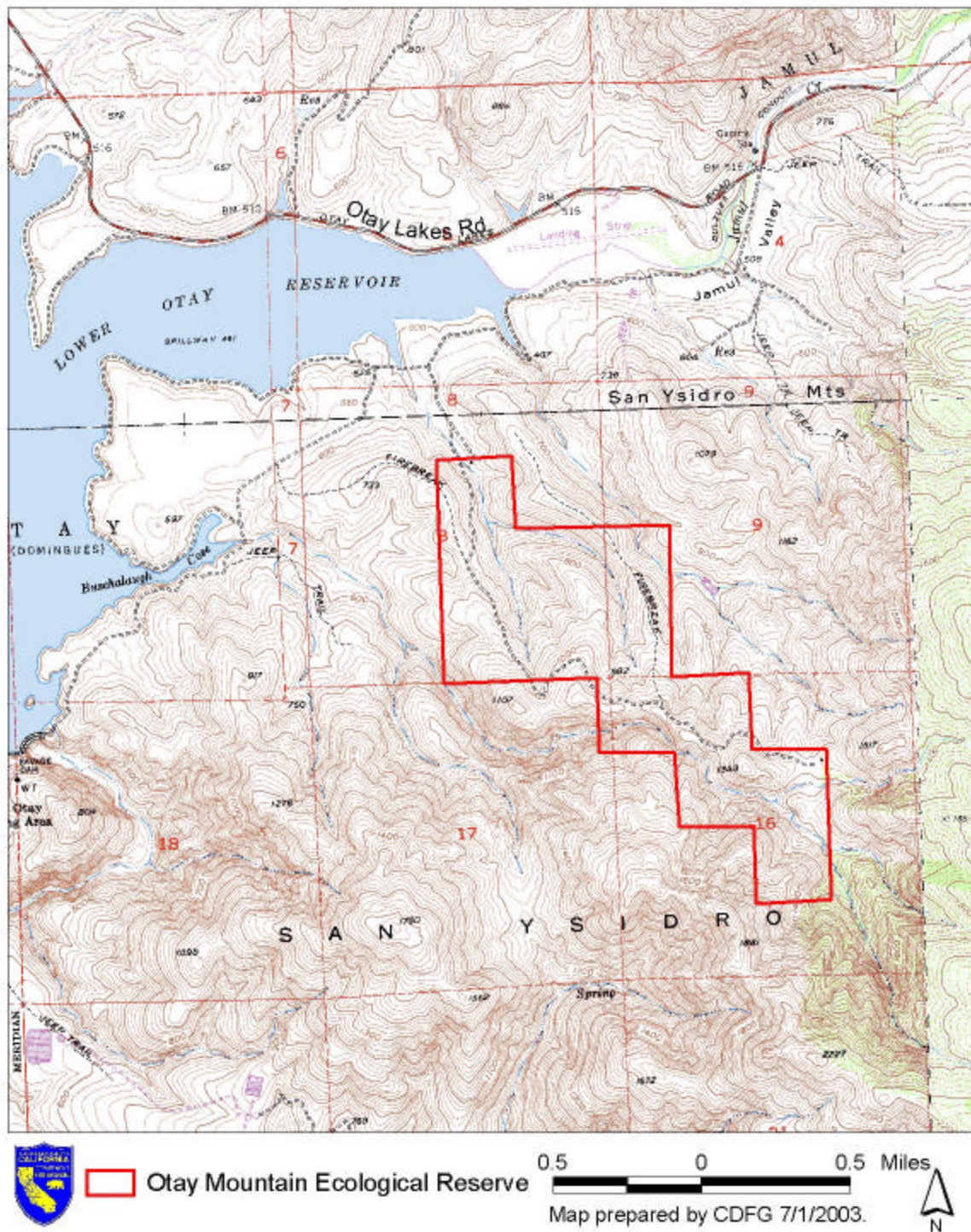


Figure 11. Map of Otay Mountain Ecological Reserve

Hollenbeck Canyon Wildlife Area

Hollenbeck Canyon Wildlife Area was acquired by the Department in 2001. The property is approximately 3,583 acres and is predominantly coast oak, chaparral, riparian, upland sage, and agriculture land. Hollenbeck Canyon is located in San Diego County, approximately 15 miles south of El Cajon, off Highway 94 and east of Honey Springs Road. Access and parking is provided off of Honey Springs Road. Current Department approved uses are hiking, bicycling, horseback riding and hunting, each in designated areas. The hunting season is from September 1st through January 31st, for upland game bird and resident small game only. No rifles or pistols may be used or possessed on the property. Limited dog training is available on Hollenbeck from September 1st through February. A kiosk with maps and information regarding property boundaries, uses and regulations are available at the parking area. Horse trailers are permitted within the designated parking area, camping and overnight use is not allowed. Resource inventory of Hollenbeck Canyon began by SCR monitors in February of 2002 (Table 8), including preliminary trapping of reptiles/amphibians and small mammals. Sensitive wildlife species were also surveyed on portions of the Wildlife Area, including the California gnatcatcher, Bells' sage sparrow, rufous-crowned sparrow, grasshopper sparrow and black-tailed jackrabbit.



Figure 12. Hollenbeck Canyon Wildlife Area

Table 8: Species Occurring on the Hollenbeck Canyon Wildlife Area, 2002

MAMMALS			
Common Name	Scientific Name	Status	Comments*
Audubon's (Desert) Cottontail	<i>Sylvilagus audubonii</i>		1 individual seen; scat and tracks in CSS.
Black-tailed Jackrabbit	<i>Lepus californicus</i>	SSC, MSCP	4 individuals seen; scat in CSS.
California Ground Squirrel	<i>Spermophilus beecheyi</i>		Burrows plus 1 individual adjacent to Wildlife Area.
Botta's Pocket Gopher	<i>Thomomys bottae</i>		3 mound complexes in CSS, 2 in oak-riparian.
San Diego Pocket Mouse	<i>Chaetodipus fallax</i>	SSC	Trapped in grassland, CSS.
Dulzura (San Diego) Kangaroo Rat	<i>Dipodomys simulans</i>		Trapped in CSS.
Woodrat sp.	<i>Neotoma</i> sp.		Nest in boulder pile in CSS.
Cactus Mouse	<i>Peromyscus eremicus</i>		Trapped in CSS.
Brush Mouse	<i>Peromyscus boylii</i>		Trapped in oak woodland.
Coyote	<i>Canis latrans</i>		2 individuals seen plus tracks, numerous scats, remote camera photos.
Gray fox	<i>Urocyon cinereoargenteus</i>		Numerous scats, tracks, remote camera photos.
Raccoon	<i>Procyon lotor</i>		Tracks
Skunk sp.	<i>Carnivora: Mephitidae</i>		Unknown; probable spotted skunk scat in CSS.
Long-tailed Weasel	<i>Mustela frenata</i>		1 scat in CSS in boulder pile; also, unknown mustelid tracks found along road in Hollenbeck Canyon. Tracks were approximately 1 inch in diameter, likely this sp.
Mountain Lion	<i>Puma concolor</i>	MSCP	One old scat fragment along trail adjacent to tributary of Jamul Creek.
Bobcat	<i>Lynx rufus</i>		Numerous scats along trail, remote camera photos.
Mule Deer	<i>Odocoileus hemionus</i>	MSCP	Numerous pellet piles, a few tracks at riparian area.
Potbellied Pig	<i>Sus</i> sp.		1 black animal ambling through grassland. Neither aggressive nor shy but avoided humans.

BIRDS			
Common Name	Scientific Name	Status	Comments*
White-tailed Kite	<i>Elanus leucurus</i>	FP	Pair, perched together in riparian. Nesting?
Northern Harrier	<i>Circus cyaneus</i>	SSC, MSCP	1 ? , foraging.
Red-tailed Hawk	<i>Buteo jamaicensis</i>		2
Red-shouldered Hawk	<i>Buteo lineatus</i>		1
Golden Eagle	<i>Aquila chrysaetos</i>	FP, MSCP	2 adults on ground, feeding.
American Kestrel	<i>Falco sparverius</i>		1 pair
California Quail	<i>Callipepla californica</i>		25+
Killdeer	<i>Charadrius vociferus</i>		1 heard from a distance.
Mourning Dove	<i>Zenaida macroura</i>		30 + including active nest on ground near rocks.
Greater Roadrunner	<i>Geococcyx californianus</i>		2
Barn Owl	<i>Tyto alba</i>		Feather found.
White-throated Swift	<i>Aeronautes saxatalis</i>		5
Anna's Hummingbird	<i>Calypte anna</i>		2
Allen's/Rufous Hummingbird	<i>Selasphorus sp.</i>		2
Acorn Woodpecker	<i>Melanerpes formicivorus</i>		1+ (many granaries seen.)
Nuttall's Woodpecker	<i>Picoides nuttallii</i>		1
Northern Flicker	<i>Colaptes auratus</i>		1
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>		3
Black Phoebe	<i>Sayornis nigricans</i>		5
Say's Phoebe	<i>Sayornis saya</i>		1
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>		1
Cassin's Kingbird	<i>Tyrannus vociferans</i>		1
Western Kingbird	<i>Tyrannus verticalis</i>		1
Hutton's Vireo	<i>Vireo huttoni</i>		1 heard
Western Scrub Jay	<i>Aphelocoma californica</i>		5
American Crow	<i>Corvus brachyrhynchos</i>		10
Common Raven	<i>Corvus corax</i>		5
N. Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>		2
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>		25
Barn Swallow	<i>Hirundo rustica</i>		1
Oak Titmouse	<i>Baeolophus inornatus</i>		1
Bushtit	<i>Psaltiriparus minimus</i>		25
Rock Wren	<i>Salpinctes obsoletus</i>		1 pair; 1 single bird.
Canyon Wren	<i>Catherpes mexicanus</i>		1 heard
Bewick's Wren	<i>Thryomanes bewickii</i>		4
House Wren	<i>Troglodytes aedon</i>		3
Ruby-crowned Kinglet	<i>Regulus calendula</i>		1
Blue-gray Gnatcatcher	<i>Polioptila caerulea</i>		1 ? in oak/riparian
California Gnatcatcher	<i>Polioptila californica</i>	FT,SSC MSCP	8 pairs, 2 single ? s, 1 single ? .

Western Bluebird	<i>Sialia mexicana</i>	MSCP	4
Wrentit	<i>Chamaea fasciata</i>		10
California Thrasher	<i>Toxostoma redivivum</i>		5
European Starling	<i>Sturnus vulgaris</i>	I	5
Phainopepla	<i>Phainopepla nitens</i>		1
Cedar Waxwing	<i>Bombycilla cedrorum</i>		15
Orange-crowned Warbler	<i>Vermivora celata</i>		3
Yellow-rumped Warbler	<i>Dendroica coronata</i>		5
Hermit Warbler	<i>Dendroica occidentalis</i>		1 ?
Wood Warbler sp.	<i>Dendroica sp.</i>		1
Western Tanager	<i>Piranga ludoviciana</i>		1 ?
Spotted Towhee	<i>Pipilo maculatus</i>		4
California Towhee	<i>Pipilo crissalis</i>		20
So. Calif. Rufous-crowned Sparrow	<i>Aimophila ruficeps canescens</i>	SSC, MSCP	12
Vesper Sparrow	<i>Poocetes gramineus</i>		1
Lark Sparrow	<i>Chondestes grammacus</i>		1
Bell's Sage Sparrow	<i>Amphispiza belli bellii</i>	SSC	10 pairs, 4 single birds.
Savannah Sparrow	<i>Passerculus sandwichensis</i>		10
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	SSC	1 pair, 3 territorial ? s, singing.
Song Sparrow	<i>Melospiza melodia</i>		2
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>		15
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>		4
Lazuli Bunting	<i>Passerina amoena</i>		2 heard
Red-winged Blackbird	<i>Agelaius phoeniceus</i>		30 in agricultural fields.
Western Meadowlark	<i>Sturnella neglecta</i>		15
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>		5+
Hooded Oriole	<i>Icterus cucullatus</i>		1
Bullock's Oriole	<i>Icterus bullockii</i>		1
House Finch	<i>Carpodacus mexicanus</i>		25
Lesser Goldfinch	<i>Carduelis psaltria</i>		5

REPTILES

Common Name	Scientific Name	Status	Comments*
Western Fence Lizard	<i>Sceloporus occidentalis</i>		3+
Side-blotched Lizard	<i>Uta stansburiana</i>		Captured in array
Coast Horned Lizard	<i>Phrynosoma coronatum</i>	SSC, MSCP	Scat found at two locations in Hollenbeck Canyon.
Western Whiptail	<i>Cnemidophorus tigris</i>		1
Orange-throated Whiptail	<i>Cnemidophorus hyperythrus</i>		Captured in array
Rosy Boa	<i>Lichanura trivirgata</i>		1, warming near CSS
Granite spiny Lizard	<i>S. orcutti</i>		Observed under board
Ring-necked Snake	<i>Diadophis punctatus</i>		Captured in array

Western blind Snake	<i>Leptotyphlops humilis</i>		Captured in array
Alligator Lizard	<i>Elgaria multicarinatus</i>		Captured in array
Western Banded Gecko	<i>Coleonyx variegatus</i>		Captured in array
So. Pacific Rattlesnake	<i>Crotalus viridis</i>		Observed above riparian
Red Diamond Rattlesnake	<i>Crotalus ruber</i>		Observed on ag. road
Western Long-nosed Snake	<i>Rhinocheilus lecontei</i>		Captured in array
Night Snake	<i>Hypsiglena torquata</i>		Captured in array
AMPHIBIANS			
Common Name	Scientific Name	Status	Comments*
Pacific Tree Frog	<i>Hyla regilla</i>		Observed in creek
Western Toad	<i>Bufo boreas</i>		Captured in array
Slender Salamander	<i>Batrachoseps pacificus</i>		Observed under board
INVERTEBRATES			
Common Name	Scientific Name	Status	Comments*
Crayfish sp.			Common
Termite sp.			Tunnels in non native grassland.
Ant sp.			Native species
Anise Swallowtail	<i>Papilio zelicaon</i>		
Western Tiger Swallowtail	<i>Papilio rutulus</i>		
Pale Swallowtail	<i>Papilio eurymedon</i>		
Common (Checkered) White	<i>Pontia protodice</i>		
Orange (Alfalfa) Sulphur	<i>Colias eurytheme</i>		
Marine Blue	<i>Leptotes marina</i>		
Dammer's (Pacific Dotted) Blue	<i>Euphilotes enoptes dammersi</i>		
Acmon Blue	<i>Plebejus acmon</i>		
Behr's Metalmark	<i>Apodemia mormo virgulti</i>		
Comstock's (Callippe) Fritillary	<i>Speyeria callippe comstocki</i>		
Quino Checkerspot	<i>Euphydryas editha quino</i>	FE	
SENSITIVE PLANTS			
Common Name	Scientific Name	Status	Comments*
San Diego Thormint	<i>Acanthomintha ilicifolia</i>	FT/SE	None found in 2002

*All records from Department of Fish and Game biologists unless otherwise noted; numbers refer to maximums detected per visit; CSS = coastal sage scrub.

Status Codes : SE-State endangered; FE-Federal endangered; FT-Federal threatened; FP-State fully protected; SSC-California Species of Special Concern; MSCP-MSCP covered species; I-Introduced.

Rancho Jamul Ecological Reserve and Hollenbeck Canyon Wildlife Area

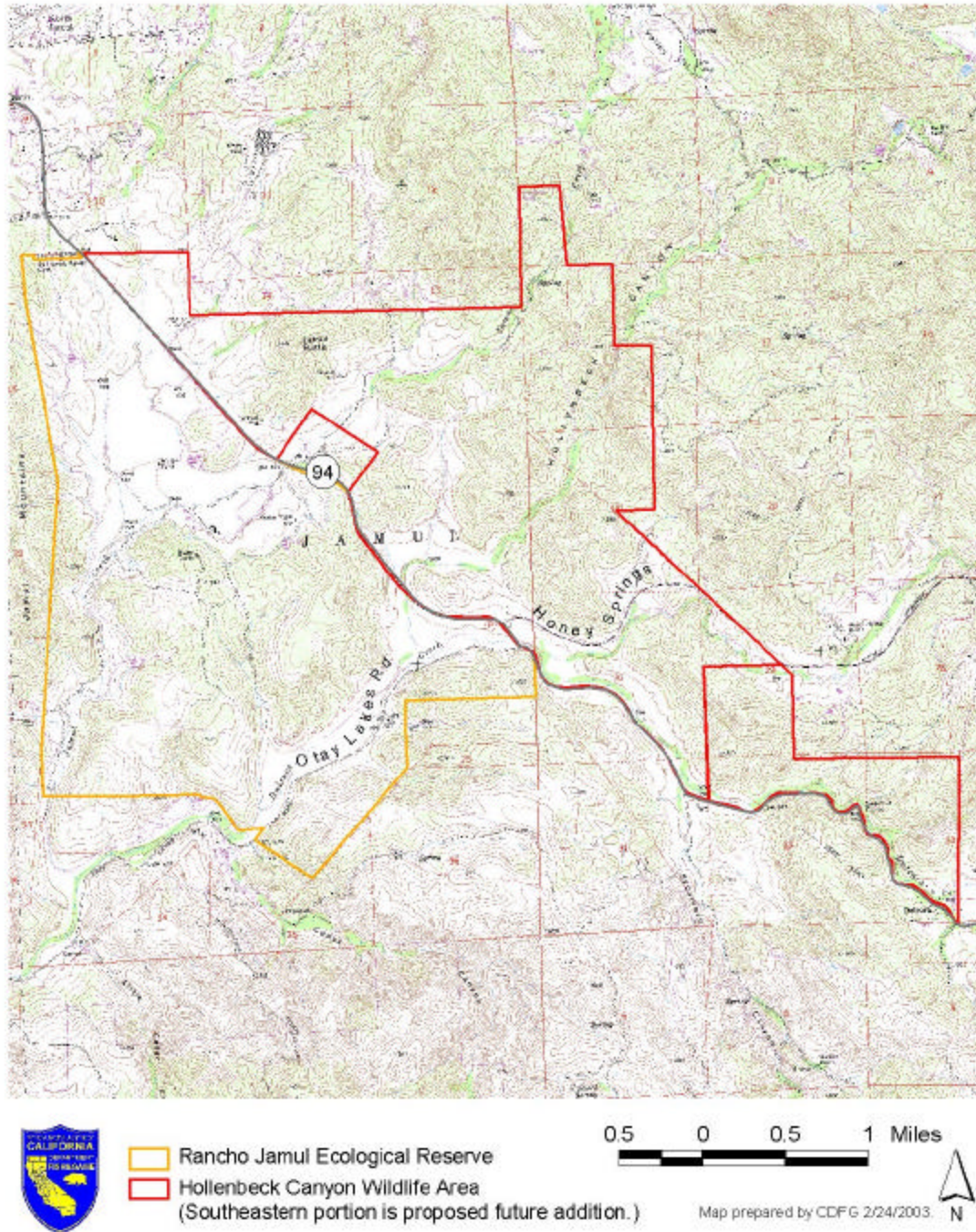


Figure 13. Map of Hollenbeck Canyon Wildlife Area

Carlsbad Highlands Ecological Reserve

The Carlsbad Highlands Ecological Reserve is a 297-acre property located in the City of Carlsbad, northwestern San Diego County. This reserve is located along the eastern boundary of the City, abutting the City of Oceanside. Cannon Road dead-ends on the property's eastern boundary. The property is part of a larger open space preserve composed of open space lands owned by the City of Carlsbad surrounding Lake Calavera, and mitigation parcels owned and managed by The Environmental Trust. The initial lands dedicated as the Carlsbad Highlands ER were set aside in 1996 as a part of the Carlsbad Highlands Conservation Bank, owned by Bank of America. Since that time additional lands have been or are in the process of being purchased or given (e.g. Caltrans) to the Department to expand the ER. This ER has a history of agricultural use, although the agricultural fields on the eastern portion of the property have been fallow for many years, and now support annual grassland habitat. Off-highway vehicle (OHV) use is another long-time destructive use of the property, which the SCR is attempting to control and eventually exclude. The majority of the rest of the property is dominated by coastal sage scrub vegetation, with a smaller amount of oak riparian habitat also being present. The larger open space area incorporating the Carlsbad Highlands ER is surrounded by residential development, with the exception of several narrow habitat corridors to the north and west. The Carlsbad Highlands ER is considered a key open space component of the City of Carlsbad's Habitat Management Plan (HMP), which is part of north San Diego County's Multiple Habitat Conservation Program.



Figure 14. Carlsbad Highlands Ecological Reserve

Resource Inventory

Along with its general values for coastal sage scrub, annual grassland, and riparian habitats, this reserve also supports two listed species: the California gnatcatcher (federal threatened) and the thread-leaved brodiaea (*Brodiaea filifolia*, state endangered and federal threatened). Along with annual general wildlife surveys, these two species are specifically monitored every year on the ER.

Table 9 lists the wildlife species observed on-site during the 2002 spring monitoring period. A minimum of four gnatcatcher territories were determined to be active on the property based upon the observation of paired birds or calling males. It should be noted that the 94-acre portion of the ER known as the Holly Springs parcel was not added to the ER until after the monitoring season had concluded in 2002. Additional gnatcatchers may be present on this new parcel, and surveys during 2003 will be conducted to assess the presence of this species, as well as thread-leaved brodiaea. Other sensitive species of note observed in 2002 were the northern harrier (pair observed foraging over the ER with possible nesting activity off-site to the west along the creek), Cooper's hawk (possible breeding pair in riparian oak woodland), osprey, loggerhead shrike, and grasshopper sparrow.

A small thread-leaved brodiaea population occurs on a clay soil area on the northern portion of the ER. This site has a history of OHV use, and is currently dominated by annual grassland, although remnants of native grassland are also present. During the spring of 2002, surveys of the brodiaea site were conducted to assess the amount of vegetative growth occurring. Using one meter square plots distributed along a 12 meter transect through the population, an attempt was made to count the number of individual plants present. The goal was to relate the number of bulbs producing vegetative growth with the number of bulbs that actually produced flowers later in the season. This sampling method proved to be impractical because of the difficulty in assigning the vegetative growth to one or more bulbs, since bulbs are often clustered together underground. Because of the severe drought conditions in 2002, no bulbs flowered. It was also noted that as the season progressed there was severe herbivory on the vegetative portions of the brodiaea, primarily from rabbits. This also likely contributed to the lack of flowering. In past years with more normal rains, this brodiaea population has produced between 30 and 50 flowering plants. During the spring and summer of 2002, a reference population of thread-leaved brodiaea at another preserve in the City of Carlsbad (The Environmental Trust preserve adjacent to the Newton Drive Business Park) was checked at the same time that the ER population was checked. As at the ER, no brodiaea flowered at this reference site, even though it has a much higher population of this plant species.

Table 9. Species occurring on the Carlsbad Highlands ER – 2002

MAMMALS			
Common Name	Scientific Name	Status	Comments*
Desert Cottontail	<i>Sylvilagus audubonii</i>		1 individual seen.
Woodrat	<i>Neotoma</i> sp.		Scat and large nest noted.
Coyote	<i>Canis latrans</i>		Scat
Domestic Dog	<i>Canis familiaris</i>		Tracks and scats
Bobcat	<i>Lynx rufus</i>		Scat
BIRDS			
Common Name	Scientific Name	Status	Comments*
Turkey Vulture	<i>Cathartes aura</i>		1 (last detected 2000)
Osprey	<i>Pandion haliaetus</i>	SSC	1
White-tailed Kite	<i>Elanus leucurus</i>	FP	
Northern Harrier	<i>Circus cyaneus</i>	SSC, MSCP	1 pair in courtship display; additional single ? .
Cooper's Hawk	<i>Accipiter cooperii</i>	SSC	1 pair. Adult ? is paired with sub-adult ? . Nest (?) in oak/riparian woodland.
Red-tailed Hawk	<i>Buteo jamaicensis</i>		5
Red-shouldered Hawk	<i>Buteo lineatus</i>		2
California Quail	<i>Callipepla californica</i>		
Mourning Dove	<i>Zenaida macroura</i>		5
White-throated Swift	<i>Aeronautes saxatalis</i>		1
Greater Roadrunner	<i>Geococcyx californianus</i>		
Anna's Hummingbird	<i>Calypte anna</i>		5
Nuttall's Woodpecker	<i>Picoides nuttallii</i>		1
Northern Flicker	<i>Colaptes auratus</i>		1
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>		2
Black Phoebe	<i>Sayornis nigricans</i>		1
Say's Phoebe	<i>Sayornis saya</i>		2
Loggerhead Shrike	<i>Lanius ludovicianus</i>	SSC	1
Hutton's Vireo	<i>Vireo huttoni</i>		1 heard
Western Scrub Jay	<i>Aphelocoma californica</i>		5
American Crow	<i>Corvus brachyrhynchos</i>		
Common Raven	<i>Corvus corax</i>		
Horned Lark	<i>Eremophila alpestris</i>		
Tree Swallow	<i>Tachycineta bicolor</i>		10
Violet-green Swallow	<i>Tachycineta thalassina</i>		3
N. Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>		1
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>		
Bushtit	<i>Psaltiriparus minimus</i>		
Bewick's Wren	<i>Thryomanes bewickii</i>		10
House Wren	<i>Troglodytes aedon</i>		
Ruby-crowned Kinglet	<i>Regulus calendula</i>		1

Gnatcatcher	<i>Polioptila sp.</i>		1 prob. Blue-gray Gnatcatcher in sagebrush, sumac on edge of riparian.
California Gnatcatcher	<i>Polioptila californica</i>	FT, SSC, MSCP	4 pairs. Habitat in area of detection is about 80% black sage, laurel sumac, some <i>Adolfia</i> and lemonade berry with very little chamise.
Hermit Thrush	<i>Catharus guttatus</i>		2
Wrentit	<i>Chamaea fasciata</i>		10
Northern Mockingbird	<i>Mimus polyglottos</i>		
California Thrasher	<i>Toxostoma redivivum</i>		5
American Pipit	<i>Anthus rubescens</i>		
Orange-crowned Warbler	<i>Vermivora celata</i>		1
Yellow-rumped Warbler	<i>Dendroica coronata</i>		
Common Yellowthroat	<i>Geothlypis trichas</i>		2
Spotted Towhee	<i>Pipilo maculatus</i>		1
California Towhee	<i>Pipilo crissalis</i>		10
So. Calif. Rufous-crowned Sparrow	<i>Aimophila ruficeps</i>	SSC, MSCP	
Savannah Sparrow	<i>Passerculus sandwichensis</i>		
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	SSC	1 ? in grassland.
Fox Sparrow	<i>Passerella iliaca</i>		
Song Sparrow	<i>Melospiza melodia</i>		2
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>		2
Indigo Bunting	<i>Passerina cyanea</i>		1 ?
Western Meadowlark	<i>Sturnella neglecta</i>		heard
House Finch	<i>Carpodacus mexicanus</i>		2
Lesser Goldfinch	<i>Carduelis psaltria</i>		5
REPTILES			
Common Name	Scientific Name	Status	Comments*
Western Fence Lizard	<i>Sceloporus occidentalis</i>		
AMPHIBIANS			
Common Name	Scientific Name	Status	Comments*
Treefrog	<i>Hyla sp.</i>		Calls
SENSITIVE PLANTS			
Common Name	Scientific Name	Status	Comments*
Thread-leaved Brodiaea	<i>Brodiaea filifolia</i>	SE, FT	No flowering plants in 2002, although vegetative growth present.

* All records from Department of Fish and Game biologists; numbers refer to maximums detected per vis it.
Status Codes : SE-State endangered; FE-Federal endangered; FT-Federal threatened; FP-State fully protected; SSC-California Species of Special Concern; MSCP-MSCP covered species; I-Introduced.

Carlsbad Highlands Ecological Reserve

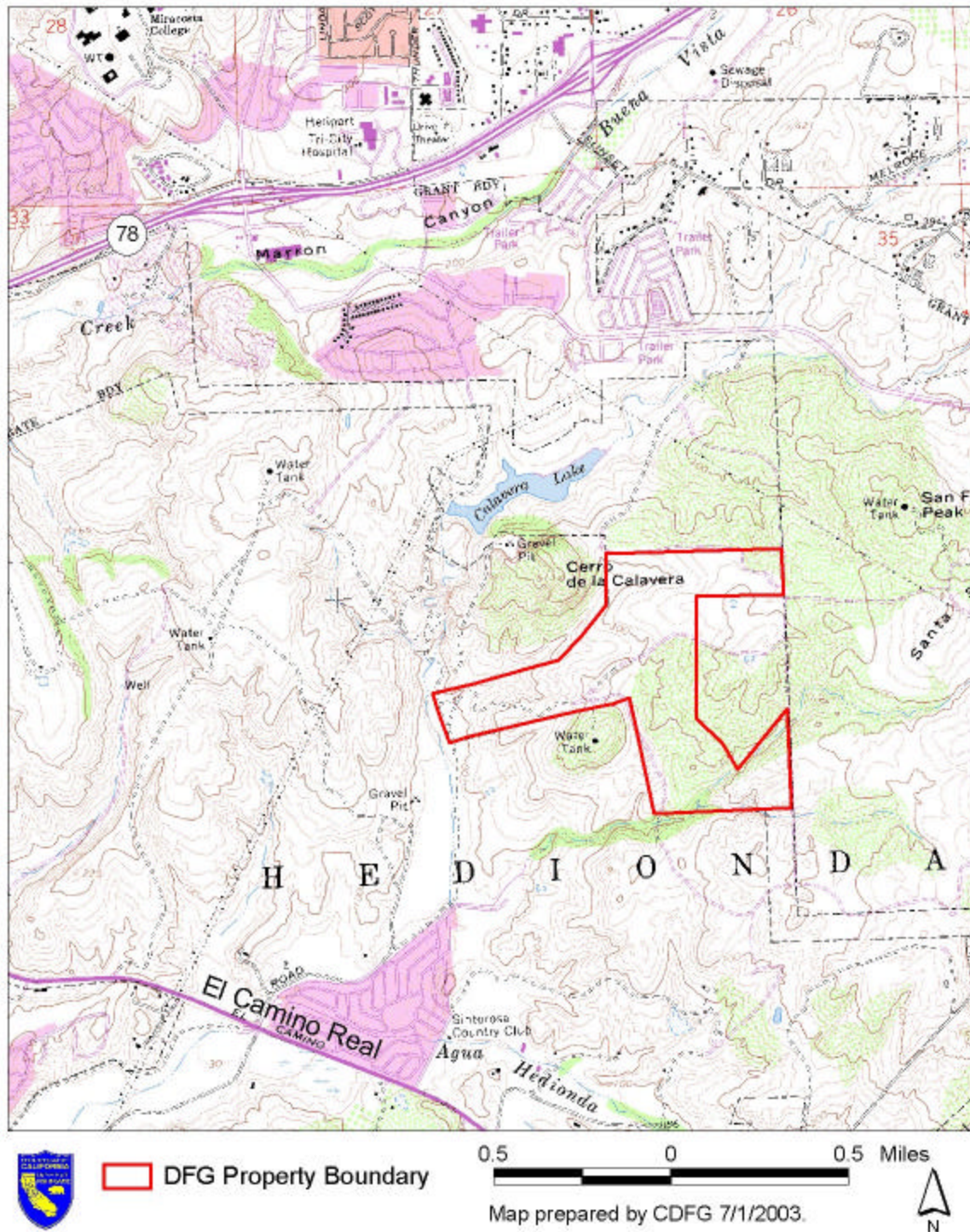


Figure 15. Map of Carlsbad Highlands Ecological Reserve

San Felipe Valley Wildlife Area

The San Felipe Valley Wildlife Area (SFVWA) is located approximately 10 miles northeast of Julian and two miles east of the Volcan Mountains. The property was acquired in two phases by the Department (1995, 1999) and is a Type C Wildlife area. The property is approximately 1,646 acres and is made up of several habitat types, including, alluvial fan sage scrub, live oak, riparian, grasslands and agricultural fields. Currently uses authorized by the Department are hiking, dog training and hunting of all legal species from September 1st through January 31st. Shotguns are allowed throughout the WA; rifles and pistols are only allowed in possession north of highway S-2 on the WA. Public parking and access are provided off of Highway S-2 and campers or trailers are not allowed on the wildlife area.. A kiosk with maps and information regarding property boundaries, uses and regulations are available at parking area and access into the property is by foot only. The resource inventory of San Felipe was started in 1997 by the San Diego Natural History Museum. The Department began an in-house bio-inventory in February of 2002 (Table 10).



Figure 16. San Felipe Valley Wildlife Area

Mule deer and mountain lion monitoring also occurs here as part of a Department study looking at the interaction of these two species. The study is conducted by the Department's Wildlife and Inland Fisheries Division, with the help and volunteership of the SCR monitoring team.

Table 10. Wildlife Species occurring in the San Felipe Valley Wildlife Area - 2002

MAMMALS			
Common Name	Scientific Name	Status	Comments*
Audubon's (Desert) Cottontail	<i>Sylvilagus audubonii</i>		1 individual seen.
Bat	<i>Myotis</i> sp.		1 individual at day roost in burned riparian. Flew when disturbed. Photo.
California Ground Squirrel	<i>Spermophilus beecheyi</i>		1 individual seen.
Woodrat	<i>Neotoma</i> sp.		Nest
Coyote	<i>Canis latrans</i>		Scat
Bobcat	<i>Lynx rufus</i>		Scat
Mule Deer	<i>Odocoileus hemionus</i>		Tracks
BIRDS			
Common Name	Scientific Name	Status	Comments*
Cooper's Hawk	<i>Accipiter cooperii</i>	SSC	2 ind., prob. pair in oak woodland.
Northern Harrier	<i>Circus cyaneus</i>	SSC	1
American Kestrel	<i>Falco sparverius</i>		1
Mourning Dove	<i>Zenaida macroura</i>		15
Barn Owl	<i>Tyto alba</i>		1 flushed from oak grove.
Western Wood-pewee	<i>Contopus sordidulus</i>		1
Hammond's Flycatcher	<i>Empidonax hammondi</i>		1
Dusky Flycatcher	<i>Empidonax oberholseri</i>		1
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>		2
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>		5
Western Kingbird	<i>Tyrannus verticalis</i>		10
Loggerhead Shrike	<i>Lanius ludovicianus</i>	SSC	4
Least Bell's Vireo	<i>Vireo bellii pusillus</i>	FE, SE	5 singing ? s: 2 well-spaced before turnaround; 2 at turnaround; 1 at WA boundary.
Warbling Vireo	<i>Vireo gilvus</i>		1
Western Scrub Jay	<i>Aphelocoma californica</i>		5
Common Raven	<i>Corvus corax</i>		4
Tree Swallow	<i>Tachycineta bicolor</i>		3
Bushtit	<i>Psaltiriparus minimus</i>		4
House Wren	<i>Troglodytes aedon</i>		1
Western Bluebird	<i>Sialia mexicana</i>		1
European Starling	<i>Sturnus vulgaris</i>	I	3
Phainopepla	<i>Phainopepla nitens</i>		5
Orange-crowned Warbler	<i>Vermivora celata</i>		1
Yellow Warbler	<i>Dendroica petechia</i>	SSC	1
Common Yellowthroat	<i>Geothlypis trichas</i>		1
Wilson's Warbler.	<i>Wilsonia pusilla</i> .		2
Western Tanager	<i>Piranga ludoviciana</i>		1
Spotted Towhee	<i>Pipilo maculatus</i>		2
California Towhee	<i>Pipilo crissalis</i>		5

Chipping Sparrow	<i>Spizella passerine</i>		2
Brewer's Sparrow	<i>Spizella breweri</i>		2
Black-chinned Sparrow	<i>Spizella atrogularis</i>		2
Vesper Sparrow	<i>Pooecetes gramineus</i>		2
Lark Sparrow	<i>Chondestes grammacus</i>		5
Black-throated Sparrow	<i>Amphispiza bilineata</i>		3
Song Sparrow	<i>Melospiza melodia</i>		2
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>		15
Blue Grosbeak	<i>Guiraca caerulea</i>		3
Lazuli Bunting	<i>Passerina amoena</i>		2
Blackbird/Cowbird sp.	Icteridae		10+ (fly-by)
Western Meadowlark	<i>Sturnella neglecta</i>		2
Bullock's Oriole	<i>Icterus bullockii</i>		1
Lawrence's Goldfinch	<i>Carduelis lawrencei</i>		3 at spring.

REPTILES

Common Name	Scientific Name	Status	Comments*
Coastal Whiptail	<i>Cnemidophorus tigris</i>		
Coast Horned Lizard	<i>Phrynosoma coronatum</i>	SSC	
Granite Spiny Lizard	<i>Sceloporus orcutti</i>		
Side-blotched Lizard	<i>Uta stansburiana</i>		
Granite Night Lizard	<i>Xantusia henshawi</i>		
San Diego Alligator Lizard	<i>Elgaria multicarinata</i>		
Speckled Rattlesnake	<i>Crotalus mitchellii</i>		
Red Diamond Rattlesnake	<i>Crotalus ruber</i>	SSC	
S. Pacific Rattlesnake	<i>Crotalus viridis</i>		
San Diego Gopher Snake	<i>Pituophis catenifer</i>		
Western Long-nosed Snake	<i>Rhinocheilus lecontei</i>		
Rosy Boa	<i>Lichanura trivirgata</i>	SSC	
California Striped Racer	<i>Masticophis lateralis</i>		

AMPHIBIANS

Common Name	Scientific Name	Status	Comments*
Western Toad	<i>Bufo boreas</i>		
Pacific Treefrog	<i>Hyla regilla</i>		

INVERTEBRATES

Common Name	Scientific Name	Status	Comments*
Edward's (Ceraunus) Blue	<i>Hemiargus ceraunus gyas</i>		

* All records from Department of Fish and Game biologists; numbers refer to maximums detected per visit.

Status Codes : SE-State endangered; FE-Federal endangered; FT-Federal threatened; FP-State fully protected; SSC-California Species of Special Concern; I-Introduced.

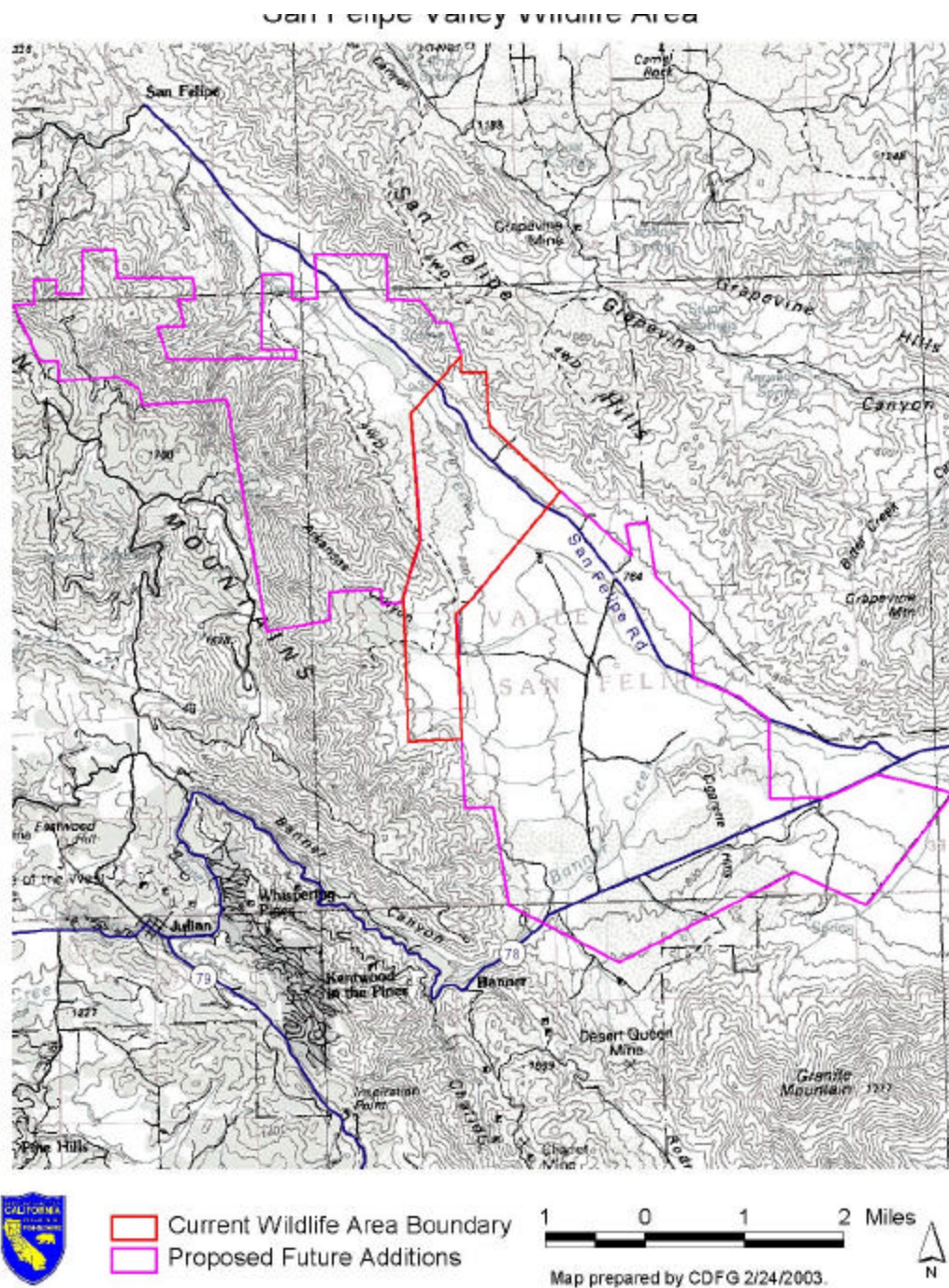


Figure 17. Map of San Felipe Valley Wildlife Area

Buena Vista Lagoon Ecological Reserve

Buena Vista Lagoon ER is located in the cities of Carlsbad and Oceanside in northern San Diego County and is the only freshwater lagoon in Southern California. It is approximately 198 acres in size and is the State's first Ecological Reserve, acquired by the Department in 1968. Access is provided along Highway 78 on the north side and Jefferson Street on the east and south sides. Current uses include hiking and fishing. Dogs are allowed, but must be restrained on leash at all times.



Figure 18. Buena Vista Lagoon Ecological Reserve.

Focused surveys for Belding’s Savannah sparrow were conducted by SCR biologists and land management staff on February 28, 2002. Several known nesting areas were accessed by kayak; the observers then walked along the salt marsh and noted presence of the sparrows and typified the types of behaviors noted (territorial display, singing, posting, carrying nesting material, etc.) The salt marsh vegetation is somewhat limited at this reserve and is heavily impacted by human foot traffic and vehicle use. Suitable habitat is still retained on the two islands in the eastern basin, however.

Seven Belding’s Savannah sparrow territories were detected during this survey consisting of one pair and six singing males. This compares with six territories documented here during the statewide survey in 2001. Table 11 summarizes the status of Belding’s Savannah sparrow at Buena Vista Lagoon from 1973- 2002.

Table 11. Territories of Belding’s Savannah sparrow at Buena Vista Lagoon Ecological Reserve from 1973 – 2002.

Number of Territories						
1973	1977	1986	1991	1996	2001	2002
0	5	1	0	0	6	7

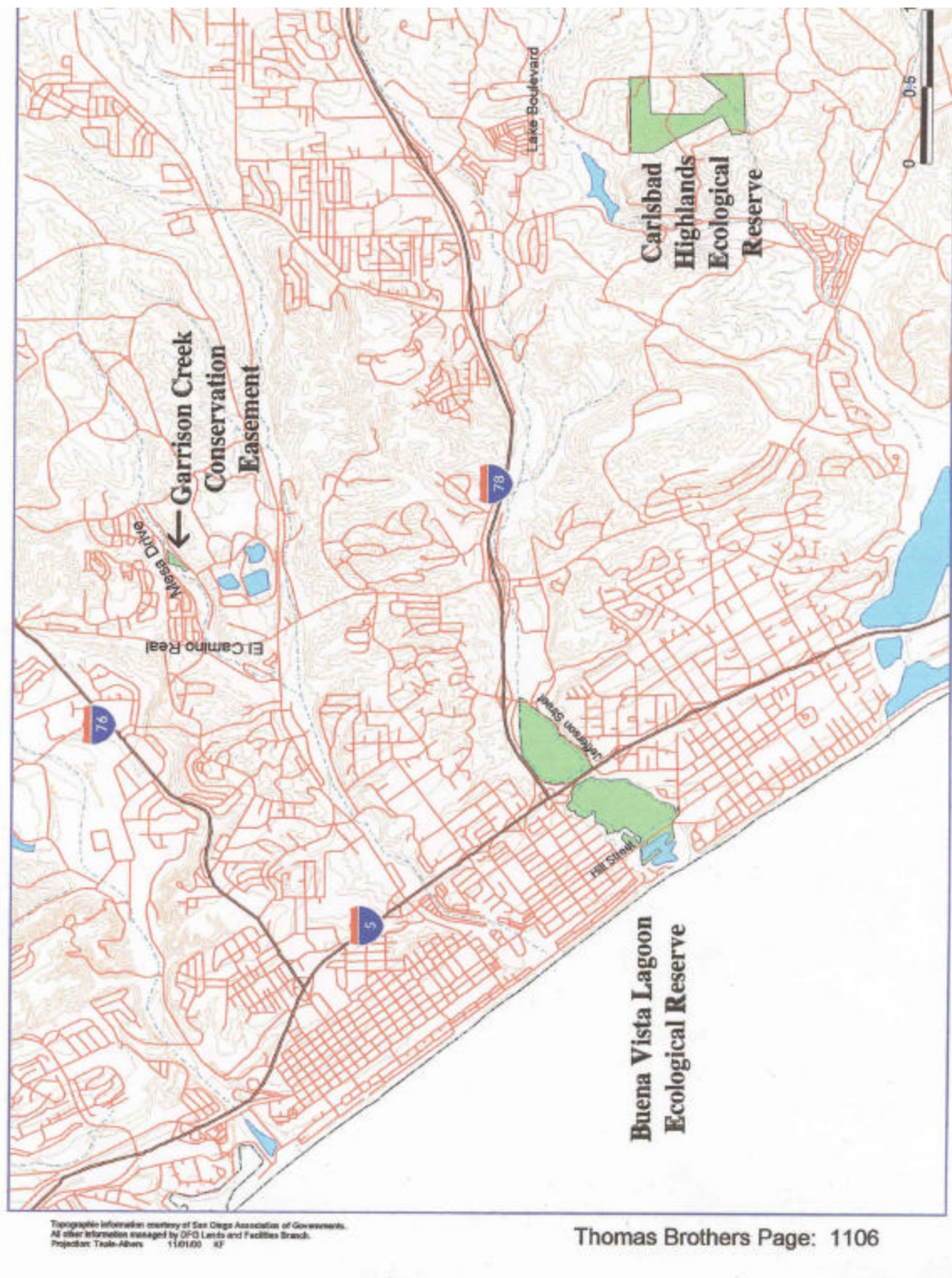


Figure 19. Map of Buena Vista Lagoon Ecological Reserve

Batiquitos Lagoon Ecological Reserve



Figure 20. Batiquitos Lagoon Ecological Reserve – 2002

Batiquitos Lagoon ER is located between the cities of Carlsbad and Encinitas, San Diego County. The entire lagoon spans approximately 600-acres; the Department property was acquired in 1978. A major restoration project, paid for with mitigation funds, occurred in the mid-1990s. Access is provided to the southern portion of the property off Highway 5 at the La Costa exit, and to the northern portion by using the Pointsettia exit. One of the largest California Least tern nesting sites in southern California is located on the property, and the Department, in conjunction with other wildlife agencies, participates in monitoring the sites during the nesting season. Current uses allowed by the Department include hiking and fishing in designated areas only. Dog walking is also allowed; however, dogs must be kept on leash at all times. Other sensitive species that inhabit the lagoon include elegant terns, black skimmers, Belding's Savannah sparrow, Western snowy plover, California brown pelican, yellow warbler and California gnatcatcher.

Batiquitos Lagoon General Avian Survey

In 2002, SCR biologists and environmental scientist staff conducted avian surveys at Batiquitos Lagoon, following a slightly modified protocol as established by Merkel & Associates, Inc., as part of the long-term biological monitoring program for the Batiquitos Lagoon Enhancement Project. Avian surveys are performed to document changes in bird community patterns following completion of the construction phase of the project.

Methods (following Merkel & Associates, Inc. 2001):

A general avian inventory of all portions of the lagoon was conducted in a systematic and simultaneous survey each quarter in 2002. The lagoon was divided into eight sampling zones (Figure 21) and surveyed on foot by five or six field biologists using binoculars and spotting scopes. The entire lagoon was covered on one day only each quarter which differs from the Merkel protocol in which sampling occurred on two consecutive days each quarter.

Data collected included species and individual counts, activities, and habitats in which the birds occurred (i.e. mudflat, shallow water, marsh, etc.). Additional data was collected on air temperature, wind, cloud cover, and precipitation. In 2002, survey dates were January 27, May 7, July 29, and October 29.

Results

A total of 116 species of birds (including 20 sensitive species and three exotic species) consisting of 38 families was observed at Batiquitos Lagoon during all survey dates in 2002 (Table 12). Data gathered from this project will be pooled with those collected by Merkel & Associates, Inc. during the course of the long-term monitoring program at Batiquitos Lagoon. Results will be presented in future SCR annual reports.

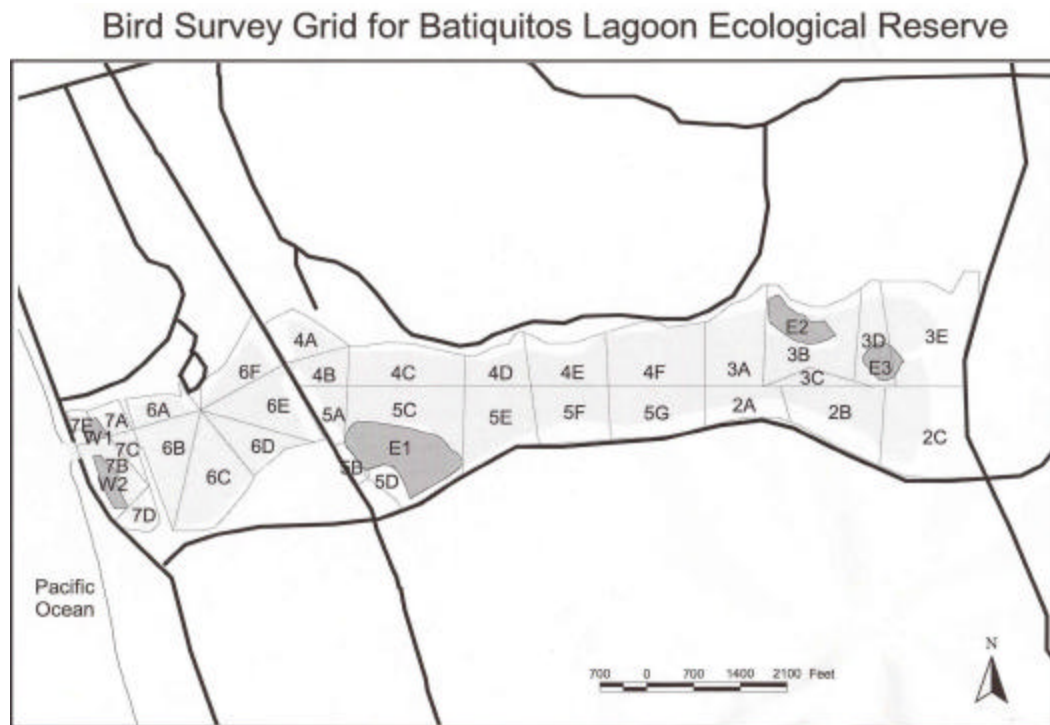


Figure 21. Bird Survey Grid for Batiquitos Lagoon ER

Reference: Merkel & Associates, Inc. 2001. Long-term Monitoring and Pilot Vegetation Program for the Batiquitos Lagoon Enhancement Project.

Table 12. Bird Species occurring in the Batiquitos Lagoon Ecological Reserve - 2002

Common Name	Scientific Name	Status
Common Loon	<i>Gavia immer</i>	
Pied-billed Grebe	<i>Podilymbus podiceps</i>	
Horned Grebe	<i>Podiceps auritus</i>	
Eared Grebe	<i>Podiceps nigricollis</i>	
Western Grebe	<i>Aechmophorus occidentalis</i>	
California Brown Pelican	<i>Pelecanus occidentalis californicus</i>	FE, SE, FP, MSCP
White Pelican	<i>Pelecanus erythrorhynchos</i>	SSC
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	SSC
Snowy Egret	<i>Egretta thula</i>	
Great Egret	<i>Ardea alba</i>	
Great Blue Heron	<i>Ardea herodias</i>	
Green Heron	<i>Butorides striatus</i>	
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	
American Bittern	<i>Botaurus lentiginosus</i>	
Mallard	<i>Anas platyrhynchos</i>	
Gadwall	<i>Anas strepera</i>	
Green-winged Teal	<i>Anas crecca</i>	
Cinnamon Teal	<i>Anas cyanoptera</i>	
American Wigeon	<i>Anas americana</i>	
Eurasian Wigeon	<i>Anas penelope</i>	
Northern Pintail	<i>Anas acuta</i>	
Lesser Scaup	<i>Aythya affinis</i>	
Canvasback	<i>Aythya valisineria</i>	
Ruddy Duck	<i>Oxyura jamaicensis</i>	
Bufflehead	<i>Bucephala albeola</i>	
Red-breasted Merganser	<i>Mergus serrator</i>	
Turkey Vulture	<i>Cathartes aura</i>	
Osprey	<i>Pandion haliaetus</i>	SSC
Red-tailed Hawk	<i>Buteo jamaicensis</i>	
Red-shouldered Hawk	<i>Buteo lineatus</i>	
White-tailed Kite	<i>Elanus leucurus</i>	FP
Northern Harrier	<i>Circus cyaneus</i>	SSC, MSCP
American Kestrel	<i>Falco sparverius</i>	
Virginia Rail	<i>Rallus limicola</i>	
Light-footed Clapper Rail	<i>Rallus longirostris levipes</i>	FE, SE, FP, MSCP
Sora	<i>Porzana carolina</i>	
American Coot	<i>Fulica americana</i>	
Black-bellied Plover	<i>Pluvialis squatarola</i>	
Pacific Golden-Plover	<i>Pluvialis fulva</i>	
Western Snowy Plover	<i>Charadrius alexandrinus nivosus</i>	FT, SSC, MSCP
Semipalmated Plover	<i>Charadrius semipalmatus</i>	

Killdeer	<i>Charadrius vociferus</i>	
Black-necked Stilt	<i>Himantopus mexicanus</i>	
American Avocet	<i>Recurvirostra americana</i>	
Spotted Sandpiper	<i>Actitis macularia</i>	
Sanderling	<i>Calidris alba</i>	
Western Sandpiper	<i>Calidris mauri</i>	
Least Sandpiper	<i>Calidris minutilla</i>	
Dunlin	<i>Calidris alpina</i>	
Greater Yellowlegs	<i>Tringa melanoleuca</i>	
Lesser Yellowlegs	<i>Tringa flavipes</i>	
Willet	<i>Catoptrophorus semipalmatus</i>	
Whimbrel	<i>Numenius phaeopus</i>	
Long-billed Curlew	<i>Numenius americanus</i>	MSCP
Marbled Godwit	<i>Limosa fedoa</i>	
Dowitcher	<i>Limnodromus</i> sp.	
Forster's Tern	<i>Sterna forsteri</i>	
Caspian Tern	<i>Sterna caspia</i>	
Elegant Tern	<i>Sterna elegans</i>	SSC, MSCP
Royal Tern	<i>Sterna maxima</i>	SSC
California Least Tern	<i>Sterna antillarum browni</i>	FE, SE, FP, MSCP
Bonaparte's Gull	<i>Larus philadelphia</i>	
Ring-billed Gull	<i>Larus delawarensis</i>	
California Gull	<i>Larus californicus</i>	
Herring Gull	<i>Larus argentatus</i>	
Western Gull	<i>Larus occidentalis</i>	
Black Skimmer	<i>Rynchops nigr</i>	SSC
Mourning Dove	<i>Zenaida macroura</i>	
Rock Dove	<i>Columba livia</i>	I
White-throated Swift	<i>Aeronautes saxatalis</i>	
Vaux's Swift	<i>Chaetura vauxi</i>	SSC
Anna's Hummingbird	<i>Calypte anna</i>	
Costa's Hummingbird	<i>Calypte costae</i>	
Belted Kingfisher	<i>Ceryle alcyon</i>	
Nuttall's Woodpecker	<i>Picoides nuttallii</i>	
Black Phoebe	<i>Sayornis nigricans</i>	
Say's Phoebe	<i>Sayornis saya</i>	
Cassin's Kingbird	<i>Tyrannus vociferans</i>	
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>	
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>	
California Horned Lark	<i>Eremophila alpestris actia</i>	SSC
Violet-green Swallow	<i>Tachycineta thalassina</i>	
Tree Swallow	<i>Tachycineta thalassina</i>	
Cliff Swallow	<i>Hirundo pyrrhonota</i>	
Barn Swallow	<i>Hirundo rustica</i>	
American Crow	<i>Corvus brachyrhynchos</i>	

Common Raven	<i>Corvus corax</i>	
Western Scrub Jay	<i>Aphelocoma californica</i>	
Common Bushtit	<i>Psaltiriparus minimus</i>	
Bewick's Wren	<i>Thryomanes bewickii</i>	
Marsh Wren	<i>Cistothorus palustris</i>	SSC
House Wren	<i>Troglodytes aedon</i>	
California Gnatcatcher	<i>Poliophtila californica</i>	FT, SSC, MSCP
Ruby-crowned Kinglet	<i>Regulus calendula</i>	
Wrentit	<i>Chamaea fasciata</i>	
Northern Mockingbird	<i>Mimus polyglottos</i>	
Cedar Waxwing	<i>Bombycilla cedrorum</i>	
Loggerhead Shrike	<i>Lanius ludovicianus</i>	SSC
European Starling	<i>Sturnus vulgaris</i>	I
Warbling Vireo	<i>Vireo gilvus</i>	
Yellow-rumped Warbler	<i>Dendroica coronata</i>	
Wilson's Warbler	<i>Wilsonia pusilla</i>	
Common Yellowthroat	<i>Geothlypis trichas</i>	
Yellow-breasted Chat	<i>Icteria virens</i>	SSC
Belding's Savannah Sparrow	<i>Passerculus sandwichensis beldingi</i>	SE, MSCP
Song Sparrow	<i>Melospiza melodia</i>	
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	
Spotted Towhee	<i>Pipilo maculatus</i>	
California Towhee	<i>Pipilo crissalis</i>	
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	
Brown-headed Cowbird	<i>Molothrus ater</i>	
Bullock's Oriole	<i>Icterus bullockii</i>	
Hooded Oriole	<i>Icterus cucullatus</i>	
House Finch	<i>Carpodacus mexicanus</i>	
Lesser Goldfinch	<i>Carduelis psaltria</i>	
House Sparrow	<i>Passer domesticus</i>	I

Status Codes : SE-State endangered; FE-Federal endangered; FT-Federal threatened; FP-State fully protected; SSC-California Species of Special Concern; MSCP-MSCP covered species; I-Introduced.

Batiquitos Lagoon Ecological Reserve

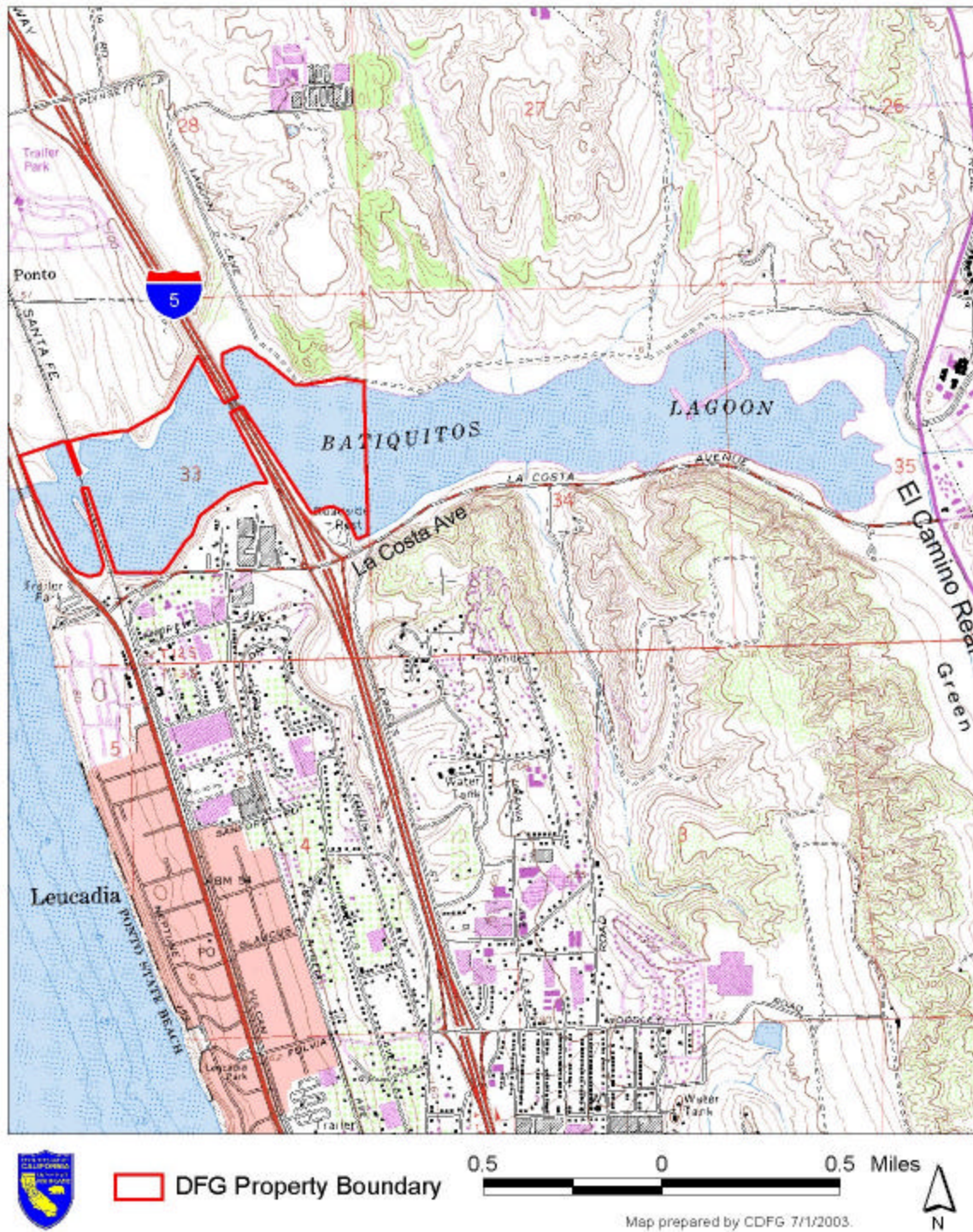


Figure 22. Map of Batiquitos Lagoon Ecological Reserve

Upper Newport Bay Ecological Reserve

The Department acquired 742 acres of Upper Newport Bay, Orange County in 1975 from the Irvine Company and later acquired an additional 10 acres in a side tributary drainage known as Big Canyon.

A comprehensive natural resource monitoring, research and management program is currently underway at Upper Newport Bay Ecological Reserve (UNBER) under the aegis of the SCR Land Management and Monitoring Program. SCR Monitoring Team presence at UNBER was somewhat limited in 2002. They conducted a focused species survey for the California gnatcatcher and the least Bell's vireo at the Reserve and surrounding environs on April 5, 2002. Results of this monitoring effort were used as part of an initial scoping phase for the Big Canyon restoration project.

No least Bell's vireos were detected in the riparian habitat located in Big Canyon. Least Bell's vireos have been seen at UNBER in 1996 and 1999; however, we know of no nesting records for vireo in this area.

Four or five California gnatcatcher territories were documented during the survey.



Figure 23. Upper Newport Bay Ecological Reserve

Upper Newport Bay Ecological Reserve

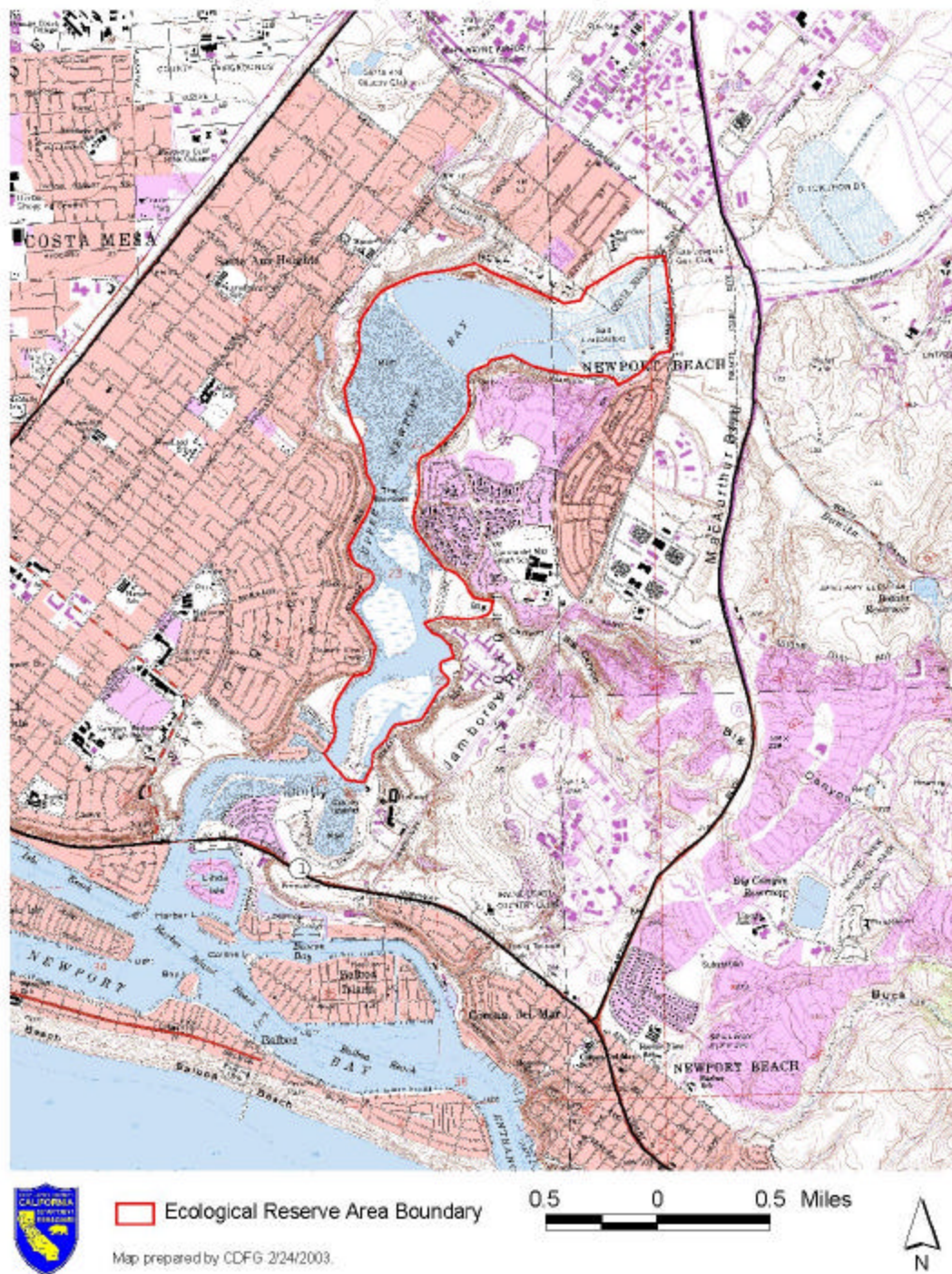


Figure 24. Upper Newport Bay Ecological Reserve

VI. MONITORING AND RESEARCH CONTRACTS

The Department supported a number of monitoring and research-related contracts in 2001/2002 to attain monitoring goals in the SCR. Table 13 lists completed or on-going contracts. Funding for these studies comes through NCCP Local Assistance Grants, federal Section 6 funds, or partnerships with other agencies or organizations. More specific information on contracts is found under earlier discussions on monitored species, research on Department lands, or the NCCP program.

Table 13. SCR Monitoring and Research Contracts: Payables & Receivables

Contract Title	Species	Contractee	Status	Amount	Type	Manager
Island Fox Candidate Conservation Agreement-Santa Cruz Island	Island Fox	TBA -The Nature Conservancy	Begin contract in 2003	\$504,000	Receivable - Section 6 (special)	Comrack
Island Fox, Island Loggerhead Shrike Candidate Conservation Agreement -Santa Catalina Island	Island Fox, Island Loggerhead Shrike	TBA - Catalina Island Conservancy	Begin contract in 2003	\$10,800	Receivable - Section 6 (special)	Comrack
Light-footed Clapper rail monitoring & protection	Light-footed Clapper Rail	TBA - Zembal, Konecny, Hoffmann, Wildlife Services	Begin contract in 2003	\$31,800	Receivable - Section 6 (traditional)	Comrack
California Least Tern monitoring & protection A2530	Least Tern	See "Type-payables"		\$50,000	Receivable - Section 6 (traditional)	Comrack
California Least Tern monitoring & protection A2552	Least Tern	See "Type-payables"		\$54,945	Receivable - Section 6 (traditional)	Comrack
California Least Tern monitoring & protection PCA TBA	Least Tern	TBA		\$25,000	Receivable - Section 6 (traditional)	Comrack
Gull-billed Tern food habits	Gull-billed Tern	See "Type-payables"		\$3,865	Receivable - Partnerships for Wildlife (PFWA)	Comrack
Bird Species of Special Concern - Phase I	Birds	See "Type-payables"		\$9,000	Receivable - PFWA	Comrack
Bird Species of Special Concern - Phase II	Birds	See "Type-payables"		\$6,000	Receivable - PFWA	Comrack
Least Tern Coordination, 2001	Least Tern	Robert Patton	Draft	\$4,999	Payable - Section 6	Comrack
Least Tern Coordination 2002	Least Tern	Robert Patton	Draft	\$4,999	Payable - Section 6	Comrack
Least Tern Monitoring - Ormond Beach	Least Tern	Walter Wehtje	Final	\$4,999	Payable - Section 6	Comrack
Least Tern Monitoring - Venice Beach	Least Tern	Kathy Keane	Final	\$4,999	Payable - Section 6	Comrack

Gull-billed Tern food habits	Gull-billed Tern	Kathy Molina	Final	\$4,993	Payable – PFWA/Tax Check-off	Comrack
Belding's Savannah Sparrow Survey 2001	Belding's Savannah Sparrow	Richard Zembal	Final	\$3,000	Payable - Tax Check-off/O & E	Comrack
San Diego Natural History Museum Bird Atlas	Birds	SDNHM	Final	\$50,000	Payable - Local Assistance	Comrack
California Bird Species of Special Concern	Birds	Point Reyes Bird Observatory	Final	\$21,693	Payable - PFWA/Tax Check-off	Comrack
Bird Species of Special Concern-range map editing & species accounts	Birds	John Sterling	Final	\$2,000	Payable – O & E	Comrack
Species Accounts – BSSC	Birds	20 contracts	Final	\$9,000	Payable – PFWA/O& E	Comrack
Habitat Surveys and population monitoring of Arroyo toad and Pacific pond turtles	Arroyo toads and Pacific pond turtles	USGS		\$183,264	Payable- Local Assistance	Hovey
Demographics and skeletal chronology of the arroyo toad	Arroyo toad	USGS		\$45,000	Section 6	Hovey
Amphibian and Ant monitoring in the Nature Reserve of Orange County	Amphibians, Reptiles and Ants	USGS			Payable – Local Assistance	Hovey
Monitoring Herpetofauna and ant diversity of the MSCP – Carmel Mt. & Del Mar Mesa	Herpetofauna and Ants	USGS		\$28,880	Payable – Local Assistance	Hovey
Ecology and Management of Otay Tarplant	Otay Tarplant	San Diego State Univ.	Final	\$41,621	Section 6	Lawhead
CSS Bird Monitoring at Lakeside Linkage	CSS birds	San Diego Co. Parks	Final	\$25,537	Payable - Local Assistance	Lawhead
Calif. Gnatcatcher Dispersal in the Lakeside Linkage	California Gnatcatcher	San Diego Co. Parks	Final in 2003	\$69,431	Payable- Local Assistance	Lawhead
MSCP Wildlife Corridor Monitoring	Carnivores	Conservation Biology Inst.	Final	\$75,000	Payable – Local Assistance-	Lawhead
MSCP Corridor Monitoring and Assessment	Carnivores	Conservation Biology Inst.	Final in 2003	\$87,595	Payable – Local Assistance	Lawhead
Rancho Jamul ER Biological Inventory	Wildlife and plant species	USGS	Final	\$59,991	Section 6	Lawhead
CSS Index of Biological Integrity	CSS species	San Diego State Univ.	Final in 2004	\$290,118	Payable – Local Assistance	Lawhead
MSCP Raptor Monitoring	Raptors	Wildlife Research Institute	Final in 2004	\$203,455	Payable – Local Assistance	Mayer

MSCP Bat Surveys	All Bat Species	San Diego Co./USGS	Final in 2004	\$103,480	Payable – Local Assistance	Fisher
Pacific Pocket Mouse Habitat Soils Analysis	Pacific Pocket Mouse	San Diego State Univ.	Final in 2003	\$91,140	Section 6	Lawhead
Orange Co. CA Gnatcatcher & Cactus Wren Monitoring	Calif. Gnatcatcher and Cactus Wren	Nature Reserve of Orange Co. (NROC)	Final	\$42,360	Payable – Local Assistance	Lawhead
NROC Vegetation Monitoring	All Vegetation Types	NROC	In progress	\$45,200	Payable – Local Assistance	Osborne
Orange Co. Carnivore Monitoring	Carnivores	NROC	In progress	\$32,760	Payable – Local Assistance	Tippets
Orange Co. Avian Productivity and Survival	Birds	NROC	Final	\$31,856	Payable – Local Assistance	Fritz
Orange Co. Ant Monitoring	Ants	NROC	Final in 2003	\$23,000	Payable – Local Assistance	Tippets
Sensitive Plant Inventory – MSCP	Sensitive Plant Species	Co. of San Diego	Final	\$110,000	Payable Local Assistance	Osborne
MHCP Biological Monitoring Plan	MHCP Covered Species	Conservation Biology Inst.	Final	\$23,232	Payable – Local Assistance	Lawhead
MSCP Monitoring & Management Protocol Herpetofauna/Monitoring Database Development	MSCP Herpetofauna	San Diego State Univ./USGS	In progress	\$288,659	Payable – Local Assistance	Tippets and Miller

VII. DEPARTMENT RESEARCH AND SPECIAL PROJECTS

Current Monitoring Research Projects

The following section presents current research being conducted by the Monitoring Team and Department biologists, either solely or in conjunction with other agency and/or non-agency personnel. Where applicable, these projects are completed, described in manuscript form and submitted to various peer-review journals for publication.

RESEARCH: Southern Steelhead Trout Research (submitted for review to California Fish and Game Journal in August of 2002) Biologist: Tim E. Hovey (Department)

During the spring of 1999 a small population of southern steelhead trout was discovered in San Mateo Creek in northern San Diego County. Immediately after the discovery, the California Department of Fish and Game (Department) initiated a program to monitor the status of the southern steelhead trout population of San Mateo Creek. Since that time a total of 40 Department-lead surveys have been conducted on the drainage.

Current Status of Southern Steelhead/Rainbow trout In San Mateo Creek

**Tim E. Hovey
California Department of Fish and Game**

Southern steelhead/rainbow trout occupying the San Mateo Creek drainage in San Diego County, California have been continually monitored with routine California Department of Fish and Game surveys from December 1999 to August 2002. Trout presence on San Mateo Creek (SMC) began to decline shortly after the surveys began and trout have not been detected on SMC proper since August 2000. Juvenile trout were discovered on Devil Canyon Creek (DCC), a tributary of SMC in May and June 2000 and adults continue to be present within the confluence. Data on water temperature indicates that temperature is more stable in DCC than in SMC. We assume that this enhances survival of steelhead in DCC. Genetic analysis established that at least two pairs of anadromous steelhead entered the drainage in 1997 to spawn and that successful F2 reproduction has occurred in DCC. Age analysis of a single adult individual indicates that maturing F2's currently occupy DCC. Observed spawning behavior and monitoring evidence gathered during this study suggests that the original steelhead trout spawned in DCC and not SMC. Water availability and the presence of exotic fish species continue to be the two main factors influencing trout survival on the San Mateo Creek drainage.

During the spring of 1999, southern steelhead/rainbow trout (*Oncorhynchus mykiss*) were discovered occupying San Mateo Creek (SMC) and Devil Canyon Creek (DCC) in San Diego County, California. All individuals observed were established to be Parred individuals using the steelhead life-stage assessment protocol. Genetic analysis conducted on fin-clips collected (SM412199F) from two individuals revealed that each specimen carried the mitochondrial DNA (mtDNA) haplotype MYS5, a haplotype that is most commonly found in southern California steelhead and has never been seen in any hatchery population of steelhead or rainbow trout (Nielsen 1994). Otolith microchemistry performed on a single sagittal otolith by researchers at The Department of Fisheries and Wildlife at Oregon State University showed that the strontium/calcium ratio established the examined fish as a F1 progeny of an anadromous female (Department steelhead report, 2000; Rieman et al. 1994). Aging analysis of a single otolith reliably aged the trout at 2+ years of age. Back calculations confirm that the anadromous steelhead adults most likely entered the San Mateo drainage during a high water period in the early spring of 1997 to spawn. This information and additional monitoring observations were combined and submitted as an original report to the National Marine Fisheries Service (NMFS) by the California Department of Fish and Game (Department) in February 2000. Immediately following the 1999 re-discovery, the Department initiated a monitoring program to track the status of the steelhead/rainbow trout population on SMC.

Before the discovery in 1999, it was generally concluded that altered habitat was the major influence in the decline of the southern steelhead trout south of Malibu Creek, California. Southern California stream communities are heavily impacted by continued urban development and habitat alteration. Urbanization frequently puts increased

pressure on groundwater resources that are already overtaxed, creating fluctuations in seasonal water availability. These alterations can leave a stream waterless or transform flowing creeks into a series of pooled habitats, environments that strongly favor nonnative fish species (largemouth bass and green sunfish) over natives. And while San Mateo Creek has been afforded a small degree of protection from these impacts due to its location on Marine Base Camp Pendleton and Forest Service property, nonnative fish species currently occupy the entire creek.

Exotic fish species like, largemouth bass (*Micropterus salmoides*), green sunfish (*Lepomis cyanellus*), bluegill (*Lepomis macrochirus*) and black bullhead (*Ameiurus melas*), have been present in great numbers within the San Mateo Creek drainage for many years (USFWS status report, 1996; Woelfel 1991) and have been shown to have a strong competitive edge over resident trout. Green sunfish have been found to feed on juvenile trout and out-compete adult steelhead for benthic food (Swift 1975; Greenwood 1988). Largemouth bass take over as top predator in the habitat they occupy and can directly predate steelhead (Stouder et al, 1997). Black bullhead are highly tolerant of high water temperatures and low dissolved oxygen levels and are extremely prolific. By sheer numbers, this species can exert a tremendous competitive pressure on an already limited resource. The presence of these species within San Mateo Creek, a drainage that experiences unreliable stream flow for immigrating adults and emigrating smolts (Lang et al. 1998), and urban alteration convinced most fisheries experts that southern steelhead trout had been extirpated from this drainage for many years.

Southern steelhead historically occurred from Santo Domingo River in northern Baja California to Malibu Creek, California. However, consistent steelhead presence has not been observed south of Malibu for the last 50-60 years. Historical records show that San Mateo Creek may have been one of the most important steelhead spawning streams on the south coast. Consistent, and in many cases large, steelhead trout runs were recorded for San Mateo Creek in the early part of the twentieth century (USFWS Report, 1998). However, trout sightings dropped off in the forties and the fifties and consistent trout abundance has not been present within San Mateo Creek in the last 50 years (USFWS Report, 1995). Due to the decline in quality habitat and the absence of steelhead trout in southern California, the National Marine Fisheries Service declared the southern steelhead trout, *Oncorhynchus mykiss*, extinct south of Malibu Creek, California in 1997.

Between August 1999 and July 2002, Department biologists conducted 30 surveys on the San Mateo Creek drainage to monitor the steelhead/rainbow trout population. All surveys were concentrated upstream of the USGS gauging station (No. 11046300) on Camp Pendleton property to the Devil Canyon confluence and included the entire Devil Canyon Creek drainage (Fig. 1). An additional 3.4 kilometers of San Mateo Creek above the Devil Canyon Creek confluence were infrequently surveyed. Prior research by the USFWS in 1998 had concluded through habitat typing that the area from Interstate 5 to the gauging station is probably used as a migratory corridor by steelhead trout when flow conditions are right and the habitat above the Base in the Cleveland National Forest would be more suitable to support small populations of steelhead (USFWS status report, 1998). Woelfel (1991) agreed that stream flow from the ocean to above the Base

property near the gauging station served as a corridor for migrating steelhead and classified some spawning habitat within the Cleveland National Forest as excellent. Additionally, downstream of the gauging station, the creek goes dry for most of the year and all of the observations made during the 1999 discovery were located upstream of the USGS station.

During this three year monitoring study additional data was collected on general observations, spawning behavior, genetics analysis, temperature variance between drainages, impacts of exotic fish species on trout and age at growth.

In July 2002, The National Marine Fisheries Service listed the southern steelhead trout, *Oncorhynchus mykiss* as endangered and the individuals currently occupying the San Mateo Creek drainage represent the southernmost documented population of this species.

The objectives of this article are to: 1) provide an outline of the monitoring observations and data gathered on the drainage since the discovery in 1999; and 2) to illustrate the current status of the southern steelhead/rainbow trout in San Mateo and Devil Canyon Creek.

The entire manuscript is available upon request from Fisheries Biologist Tim E. Hovey.

RESEARCH: Bullfrog impacts on native systems (in Review)

Biologists: Tim E. Hovey (Department) and Darrin R. Bergen (Department)

The exotic bullfrog, *Rana catesbeiana* is a highly adapted, omnivorous frog that has been shown to negatively impact California's native aquatic organisms. Its prolific nature and ability to inhabit and thrive in questionable water sources, illustrates its adaptability. The tadpole stage of the bull frog possess a tetrodotoxin on the skin, making the larvae unpalatable to predators. The time period from tadpole to metamorphosis in the California climate can be as short as six months and juvenile metamorphs are preyed upon by larger bull frogs and little else. Reproductive maturity can be achieved in two-three years and adult females can produce from 20,000 to 50,000 eggs in a single season. Adult bull frogs are extremely difficult to capture and once disturbed, may hide on the bottom of a creek or pond for well over several hours.

In open pond and lake systems, adequate methods of control may be futile. However, in creek or stream systems, the geography of these waterways may prove advantageous for control of the bull frog. Additionally, in dryer years, isolated pools will concentrate the adults and if proper removal efforts are employed, they may succeed in controlling propagation and in some cases significantly impacting the population. Coupling repeated efforts with the control of the larvae, either with pool seining or the natural evaporation of inhabited pools during the dry season and control can be obtained.

During the 2001 and 2002 season, three drainages were selected for a focused exotic removal research project. Those drainages were San Juan Creek, San Mateo Creek (upper and lower) and Boden Canyon Creek, located on Department property. The research project was centered on the predatory and competitive impacts of the non-native bullfrog on native systems. We wanted to analyze the prey items chosen by bullfrogs in certain habitats. A total of 500 bullfrogs were collected from these three drainages. Each frog was weighed to the nearest tenth of a gram and measured to the nearest millimeter snout-urostyle length (SUL). The stomachs contents of each animal were removed and analyzed under a dissecting scope. Items were identified as specifically as possible, weighed and counted. The food item data was expressed as an index of relative importance (IRI) and graphed according to the top five items ingested.



Figure 25.
Scientific aid, Dan Marschalek
and Department Biologist
Darrin Bergen remove and
analyze prey and food items
from the stomachs of bullfrogs.

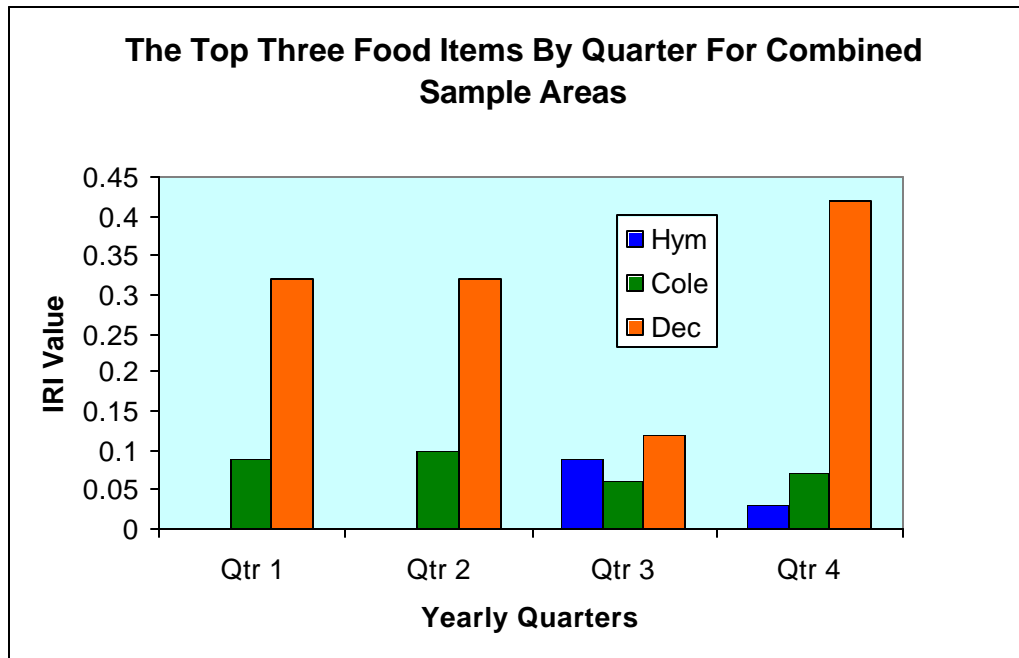


Figure 26. Diet by quarters: (January – March, April – June, July – September and October – December) for all sample locations combined. Crayfish is the dominant prey item for all four quarters (IRI by quarter respectively = 0.33, 0.32, 0.13 and 0.43).

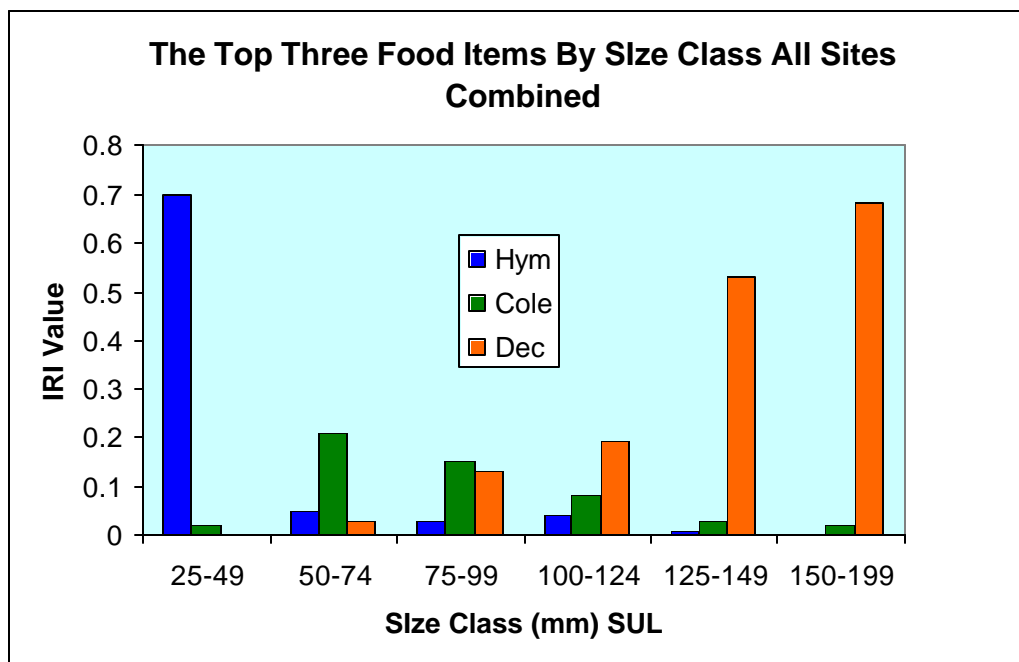


Figure 27. Diet by size class: Size classes were arbitrarily divided into six groups by length (SUL) mm. ((1) 25-49, (2) 50-74, (3) 75-99, (4) 100-124, (5) 125-149 and (6) 150-199). The size of food items are shown to correlate with frog lengths as expected. Bees (Hymenoptera) are small food items, beetles (Coleoptera) are classified as medium food items and crayfish (Decapoda) were classified as large food items.

The data illustrated in Graph 1 indicates that Decopods or crayfish are the dominant food item for the bull frog for each quarter as represented by IRI value. The quantity and size of the decopods, as represented by the combined IRI value overshadow the fact that crayfish were not present at the Boden Canyon sampling location. While it was perceived as a benefit to remove the bull frog from the three drainages, implications of removing a primary exotic predator (bull frog) that feeds on a secondary exotic predator (crayfish) should be investigated.

The data illustrated in Graph 2 show expected results. The food items and the IRI values increase as the size of the bull frog increases. This data graph was produced to illustrate the top food items per size of bull frog. This information is slated for submission in journal form in 2003.

RESEARCH: New account of native, special concern snake species consumed by *Rana catesbeiana* (Herpetological Review – in print December 2003)
Biologists: Tim E. Hovey (Department) and Darrin R. Bergen (Department).

While conducting the bullfrog stomach analysis, we discovered that one of the food items had not been previously recorded as a prey item of *Rana catesbeiana*. The prey item was a two-striped garter snake (*Thamnophis hammondi*), a special concern species for the state of California. The current state status of the snake and the fact that in the analysis of over 500 bullfrog stomach samples, it was the only species of snake found, made this information noteworthy. The data was written up in note form and submitted to Herpetological Review in January of 2003. It was accepted for publication in February of 2003 and is due for publication in December of 2003. A draft copy of the note is attached.

Note: *Rana catesbeiana* Predation

AN02-80

RANA CATESBEIANA (Bullfrog) PREDATION. *Rana catesbeiana* is known to eat a variety of small vertebrates including snakes (Bury and Whelan 1984. Ecology and management of the bullfrog. U.S. Dept. Interior, Fish Wildl. Serv., Resource Publ (155):1-23, and references therein).

Table 14 provides data on bullfrogs from the San Mateo Canyon Wilderness Area on the upper portion of the San Mateo Creek drainage, in the Cleveland National Forest, Riverside County, California (T7S, R5W) that contained *Thamnophis hammondi* in the stomach contents. The condition of the prey items collected on 20 June and 24 July suggested they had been recently consumed.

Table 14. Bullfrog, *Rana catesbeiana* and prey, *Thamnophis hammondi* collected in Riverside County, California, during 2001.

Date	Bullfrog sex	Snake SVL (mm)	Snake Mass (g)	Bullfrog mass (g)	Bullfrog SUL (mm)
20-Jun-01	Female	501	35.2	402.1	140
24-Jul-01	NA	220	3.38	154.7	108
24-Jul-01	Female	197	2.97	223.5	130
22-Aug-01	Male	185	2.82	51	86

In the examination of the stomach contents of over 500 bullfrogs collected from three California drainages no other snake species was observed. While anecdotal information may exist on bullfrogs consuming native California snakes, to the best of our knowledge this report is the first repeated account of bullfrog consumption of the two-striped garter snake, *T. hammondi*, a species of special concern for the State of California.

Submitted by TIM E. HOVEY, California Department of Fish & Game, 4949 Viewridge Avenue, San Diego, California 92123, USA, and DARRIN R. BERGEN, California Department of Fish & Game, 8604 La Jolla Shores Drive, La Jolla, California 92037, USA.



Figure 28. *Thamnophis hammondi* as a prey item in the nonnative bullfrog. Photo by Tim E. Hovey

RESEARCH: Post-fire impacts of Herpetofauna.

Biologist: Tim E. Hovey (Department) and Jenny O'Brien (Department)

In the summer of (August 16th) 2001, the Orosco Ridge fire burned roughly 1,000 acres through the Boden Canyon Ecological Reserve (BCER). Prior to the blaze, preliminary bio-inventory had been conducted in the area, resulting in a substantial herpetofauna list. Department biologists decided that the post-effects of the fire on small mammals, invertebrates and reptiles and amphibians would be valuable information for prescribed fires on ecological reserves and for future land management.

Approximately three weeks after the fire, a pitfall array was constructed in the burned area to observe the re-colonization or re-distribution of animals within the disturbed area. Similarly, an additional pitfall array was constructed in an area that had not been impacted by the fire, within similar habitat and at the same elevation in BCER. The traps were opened for a period of three to four days, every other week, for an entire year.

The object of this research is to compare species diversity and species abundance of reptiles, amphibians, mammals and inverts between the burned area (disturbed) and the non-burned area (undisturbed) over the course of a year.

Currently these data are being analyzed and the information will be submitted for publication.

RESEARCH: Spatial and Temporal Comparison of Sampling Techniques.
Biologists: Tim E. Hovey (Department) and Eric Waardenberg (Department)

Surveys techniques for amphibians and reptiles have relied mostly on those collected in pitfall arrays. While long considered the industry standard, arrays have a few negative sampling aspects. Once an array is in place it cannot be moved or relocated without substantial effort. The device itself impacts the habitat considerably once installed, and the trap will undoubtedly collect and kill non-target animals when sampling. The array must also be opened and closed for each sample period. Their conspicuous nature also invites unwanted attention and often portions of the array are vandalized or opened when they are not supposed to be sampling. This results in the death of target and non-target animals due to exposure. Cost is also a factor; a single array may cost around \$200.00, not including the labor to install it.

It is for these reasons that the monitoring team began to evaluate other sampling techniques for obtaining reptile and amphibian diversity and abundance. A search of the literature revealed that coverboards (2 ft. X 2 ft. pieces of $\frac{3}{4}$ inch plywood) were frequently utilized for herpetofauna sampling. Papers by Tietje and Vreele and 1997, describe use of coverboards in conjunction with pitfall trap array data to compare sample techniques. However, these studies did not compare the two techniques in a spatial or temporal design. The SCR monitoring group designed a research project that would compare both techniques at the same sampling locations and during the same time of year.

In June of 2002, three reptile arrays were installed at Hollenbeck Canyon Wildlife Area. Directly adjacent to the arrays, and located within the same habitat type, an array of coverboards, was placed. Nine coverboards with placed in a 3X3 grid, spread out over a 50 meter X 50 meter area. The cover boards were checked at the same time the pit fall arrays were open and sampling. Currently data is being collected on species diversity and species abundance within each sample technique.

SPECIAL PROJECT: California Bird Species of Special Concern Project Update
Biologist: Lyann Comrack (Department), Project Manager

Summary:

The purpose of this project is to develop and produce a document and supporting materials entitled "California Bird Species of Special Concern 2003, A Ranked Assessment of Species, Subspecies and Distinct Populations of Birds of Immediate Conservation Concern in California". Completion of the project will allow the Department to 1) assess the quality and quantity of available data on native birds (especially nongame species), 2) develop a process which can be objectively evaluated, refined and used for future conservation priority-setting exercises, 3) identify imperiled bird species which merit consideration for listing or other immediate protection, and 4) develop a ranked list of bird taxa which represent priorities for bird conservation in California.

Background:

The Department established an administrative designation, “Species of Special Concern,” in 1978 with the publication of a document entitled “Bird Species of Special Concern in California.” The designation was intended to identify those species that were either declining or vulnerable and may warrant listing under the California Endangered Species Act (CESA) or federal Endangered Species Act (ESA). Since its inception, and with the passage and implementation of the California Environmental Quality Act (CEQA), the Species of Special Concern designation has been used extensively by Department personnel to identify those species that may meet the definition of “rare, threatened or endangered” in CEQA Guidelines §15065 for purposes of establishing appropriate project avoidance and mitigation measures; by local governments in the land use planning and project planning process to identify land use opportunities and constraints; by Department biologists to focus limited non-game research and management resources; and to assist in the decision-making process regarding sensitive species to cover in NCCP planning efforts.

Revision of the “California Bird Species of Special Concern” (hereafter BSSC) document began in 1993. The emerging discipline of conservation and research priority ranking, supported by a significant body of literature, provided the impetus for a decision by the Department to increase the scope of the California Bird Species of Special Concern project from an earlier to its present, more scientifically rigorous, form.

Methods:

In January 1998, the Department formed a Technical Advisory Committee (TAC), whose expertise extended throughout California, to 1) draft a new definition for Species of Special Concern, 2) develop criteria, based on published literature modified to address factors specific to California, to distinguish Species of Special Concern from among nominee taxa, and 3) provide peer review and guidance for scoring and evaluating taxa. A group of over 290 bird taxa was selected for BSSC consideration and were scored against seven objective criteria, as follows:

Population Trend (PT)

This criterion estimates the change in a taxon’s population size from the time of the publication of Grinnell and Miller (1944) to the present. Scores are based on quantitative or anecdotal data on the magnitude of population change or, if lacking, data on changes in the availability or condition of a taxon’s habitat. Taxa may be given a 0 for population trend, even if the California population is declining, if the overall population is stable or increasing and the decline in California results from a geographic shift in the range that was *not* caused by habitat loss or degradation or other threats in California (e.g., Cackling Canada Goose).

Population size:	Score
seriously (>80%) reduced	20
greatly (>40-80%) reduced	15
moderately (>20-40%) reduced	10
slightly (>10-20%) reduced or suspected of having been reduced but trend unknown	5
stable (<10% reduced) or increasing	0

Range Trend (RT)

The range trend criterion estimates the change in the size of a taxon's breeding or wintering range in California from the time of publication of Grinnell and Miller (1944) to the present. Scores are based on gross changes to a taxon's range polygon (i.e., the outlying boundary of the range). Taxa that currently do not breed in the majority of years in an area where they formerly bred annually are treated as quasi-extirpated there, and, hence, the area is considered unoccupied for the purposes of calculating range trend (or size). When more thorough data are lacking, range trend can be inferred by loss of habitat. The trend does *not* estimate the extent of local extirpations within the overall range. Taxa may be given a 0 for range trend, even if the California population is declining, if the overall population is stable or increasing and the reduction in the California range results from a geographic shift in the range that was *not* caused by habitat loss or degradation or other threats in California.

Range size:	
seriously (>80%) reduced	20
greatly (>40-80%) reduced	15
moderately (>20-40%) reduced	10
slightly (>10-20%) reduced or suspected of having been reduced but trend unknown	5
size stable (<10% reduced) or increasing	0

Population Size (PS)

This criterion estimates the number of individuals of a taxon in California during the season of concern (breeding, wintering or otherwise).

Population size:	
<1000 individuals	10
=1000 but <10,000 individuals	7.5
=10,000 but <100,000 individuals	5
=100,000 but <1,000,000 individuals	2.5
>1,000,000 individuals	0

Range Size (RS)

The range size criterion estimates the percentage of California occupied by a taxon, measured by the range polygon's outlying boundary, i.e., *not* by summing the size of all areas of local occupation within the overall range. Taxa that currently do not breed in the majority of years in an area where they formerly bred annually are treated as quasi-extirpated there, and, hence, the area is considered unoccupied for the purposes of calculating range size (or trend). Seabirds or other waterbirds restricted solely to coastal estuarine, inshore, or pelagic waters are evaluated based on the marine environment from the California coastline west 200 miles (American Birding Association Checklist Area). All other species are evaluated based on terrestrial California, i.e., the political boundary of the state exclusive of ocean waters. This criterion is more difficult to apply for seabirds or waterbirds using ephemeral wetlands in the interior than for solely terrestrial taxa. Still, as the range is determined from the outlying boundary, estimation of its size need not take into account periodic or frequent local shifts in distribution reflecting patchy or ephemeral features in response to changing currents or upwelling patterns, or drying of wetlands during drought, but should instead focus on the broad pattern of distribution over a period of years representing the normal range of environmental variation.

Range size (% of California occupied):

=10%	10
>10%-50%	5
>50%	0

Percentage of Entire Range within California (EN)

This criterion measures what proportion of a taxon's North American range or population occurs within California. Taxa with a high proportion of their range or population within California are considered of greater concern than taxa with only a small proportion of their range or population in the state.

Proportion of North American range and/or population within California:

100% (endemic)	10
>80% but <100% (near-endemic)	7.5
>50%-80%	5
>20%-50%	2.5
≤20%	0

Population Concentration (PC)

This criterion estimates how concentrated a taxon currently is within its California range during critical life stages (e.g., breeding, migration). Highly concentrated taxa generally are considered more vulnerable to habitat loss, predation, disease, or other catastrophic events than are widely dispersed taxa. For example, an endemic subspecies of a landbird

might be very vulnerable to a catastrophic fire on one of the Channel Islands. This criterion defines a “site” as any more-or-less disjunct habitat island, including true islands (or offshore rocks) in the ocean or a lake or river, isolated headlands, well-bounded water bodies or wetlands (e.g., coastal estuary, lake, isolated salt marsh), “sky islands” (habitats high on mountain peaks and isolated from similar habitat on other distant peaks), or other well-isolated or fragmented habitat patches. The criterion should be used with caution for taxa that are not colonial breeders.

Majority (>50%) of population concentrated at:

1-3 sites.	10
4-30 sites.	5
>30 sites.	0

Impact of Threats (THR)

This criterion estimates the approximate impact of realized known threats and (secondarily) potential irregularly occurring catastrophic events (e.g., oil spills, disease events) known to periodically affect some taxa. Scores are based on projected long-term realized impacts of single or multiple threat factors and not on speculative threats for which there is no reasonable basis or historic precedent.

In the next 20 years, habitat loss, habitat degradation, or other human induced threats are projected to:

seriously reduce (>20%) a taxon’s population in California	20
greatly reduce (>15-20%) a taxon’s population in California	15
moderately reduce (>10-15%) a taxon’s population in California	10
slightly reduce (>5-10%) a taxon’s population in California	5
have no substantial net impact, i.e., a taxon’s population should remain stable (\leq 5% reduced) or increase in the next 20 years	0

A final draft list of scored taxa was developed and a ranking scheme to identify taxa warranting inclusion on the BSSC list was developed. On the basis of preliminary scores, two ranking methods were used - one linear and the other categorical – to identify taxa for inclusion on the BSSC list as a whole and further discriminate within three levels of conservation priority. Eighty one taxa were ultimately included on the draft list.

To complete the written BSSC document, including the methods, results, analysis, and recommendations sections, the Department entered into a contract with the Point Reyes Bird Observatory (PRBO) in 2001. Individual species accounts and range maps were concurrently completed by biologists considered to be experts with each BSSC taxon. An internal (Department) and external peer review process is currently underway. The final document, including species accounts and range maps, will be published as a special monograph of the Western Field Ornithologists (WFO) in collaboration with PRBO and

the Department. A web version and other electronic media will further our goals for distribution of, and access to, the BSSC monograph.

Results:

To ensure the ranking criteria and scheme would be consistent with the concept of a species of special concern, *Bird Species of Special Concern in California* are defined as:

Those species, subspecies, or distinct populations of native birds that currently satisfy one or more of the following criteria:

- Meet the state definition of threatened or endangered but have not formally been listed.
- Are extirpated from the state totally or in their primary seasonal or breeding role and were never listed as state threatened or endangered.
- Are listed as federally, but not state, threatened or endangered.
- Are experiencing, or formerly experienced, serious (non-cyclical) population declines or range retractions (not reversed) that if continued, or resumed, could qualify them for state threatened or endangered status.
- Have naturally small populations exhibiting high susceptibility to risk from any factor(s) that if realized could lead to declines that would qualify them for state threatened or endangered status.

The Document :

The draft document entitled “California Bird Species of Special Concern 2003, A Ranked Assessment of Species, Subspecies and Distinct Populations of Birds of Immediate Conservation Concern in California” was produced under contract with the Point Reyes Bird Observatory and reviewed by many of the State’s top ornithologists as well as knowledgeable land managers and state and federal agency biologists. In it, a method for identifying and ranking “at risk” birds is articulated; 44 full species and 26 subspecies or distinct populations of birds are identified for inclusion on the list. An additional 11 taxa are unranked but included on the list by virtue of being extirpated from the state or included on the Federal but not the State’s Threatened and Endangered species list.

A California “Responsibility List” is also included for longer term conservation planning. This list includes 119 taxa so identified because their global populations occurs wholly or mostly within the borders of California. The authors conclude with a set of conservation recommendations for species of special concern.

A comprehensive database showing all species’ criteria scores has been updated incorporating recommendations from technical experts and account authors. This database will serve as a baseline upon which future revisions of the document may rely.

Species Accounts and Range Maps :

Species accounts have been prepared for 70 taxa by 45 authors, each author an expert with their given taxon or suite of species. The 11 additional taxa included on the BSSC list by virtue of their status as being extirpated from California or as federally-listed species (although not State-listed) did not require species accounts. Species accounts focus on the taxon's general range and abundance, seasonal status in California, historical and recent range and abundance in California, ecological requirements, and threats; additionally, the authors make management, research and monitoring recommendations. Maps showing current range accompany each account. These maps were subjected to editing for consistency and accuracy by a team of two ornithologists and are currently being digitized through cooperative arrangement with the Wildlife Habitat Relationships program.

A draft of the document, database, and species accounts is currently undergoing peer review. The Department anticipates releasing the final document and associated materials in both print and electronic versions by the end of 2003.

The development of the BSSC has been a highly collaborative process between the Department, PRBO, WFO, as well as numerous ornithologists who have contributed their expertise and judgment to this important state-wide analysis. The final stage of the project will bring the work of this large group of experts to fruition.

VIII. CONCLUSIONS AND RECOMMENDATIONS

Conclusions and Recommendations – 2002 Monitoring Report

The SCR Monitoring Team spent significant time in 2001-2002 conducting biological inventories of land recently purchased by the Department, much of it associated with the development and implementation of the State's NCCP Program. These lands have conserved important biological resources and have provided biological linkages to other conserved lands owned by other agencies and jurisdictions. All of these lands together make up the NCCP preserve systems in different parts of the region. The Department is committed to monitoring these vitally important lands consistent with the monitoring principles and requirements of the various NCCP plans in the region.

The SCR has been able to collaborate with expert contractors, agencies, and volunteers to supplement and assist in-house monitoring efforts to track the status of biological resources in the region. We anticipate continuing our partnerships into the future, not only for biological monitoring but also for research on key species, species groups and habitats, and for adaptive management purposes. The results of these efforts will allow us to refine monitoring protocols to be more effective, and to gain better insights into what should be monitored to assess the health of ecosystems and individual species. Some key collaborators have included: USGS, San Diego State University, Conservation Biology Institute, USFWS, Wildlife Research Institute, San Diego Tracking Team, The Nature Conservancy, and the Center for Natural Lands Management.

The SCR is involved in two education-related programs which will eventually produce volunteers to assist with biological monitoring activities. First, the SCR is cooperatively working with the San Diego Natural History Museum in the development of a Junior Naturalist program. This effort will train junior high students in field biology to lead interpretive activities for the museum. The training includes extensive field work at several Department reserves, including the Rancho Jamul ER. Secondly, the SCR is working with the Endangered Habitats League to support the establishment of the Earth Discovery Institute at the Crestridge Ecological Reserve. This program will also teach middle and high school students about the natural world, and train them to assist with future monitoring and management projects at Crestridge ER.

Continuing to demonstrate leadership in the realm of species monitoring, management and recovery, the SCR Monitoring Team is committed to providing species-level information on sensitive as well as non-sensitive species. Expanding knowledge at the species level will enable the Team to document trends, which may have recovery and management implications. It is also the goal of the Team to establish itself as a research-oriented entity by participating in and presenting original research at relevant symposia and conferences.

SCR Species Outlines

This section contains information about some of the sensitive fish, amphibians and reptiles that inhabit SCR. Included are biological, habitat and seasonal information for each species that may provide guidelines for management and mitigation issues. Breeding and spawning seasons are highlighted in bold type to indicate critical periods when disturbance and habitat impacts should be avoided. Future reports will include sensitive bird and mammal information as well. The information was compiled using the current available literature.

Southern Steelhead **(*Oncorhynchus mykiss irdeus*)**



Status: **Federal - Endangered** **State (CDFG) – Species of Special Concern**

Description:

The Southern Steelhead is a large member of the Salmonidae family that can attain sizes of up to 9 kg. This species of sea-run rainbow trout has forked caudal fins, large mouths, and well developed teeth. Individuals have small scales and lack basibranchial teeth.

Distribution and Habitat:

Southern Steelheads are probably more tolerable to variable environmental conditions and warmer water temperatures than the Northern Steelhead. Preferred spawning habitat is that of high elevation headwaters located close to the ocean. Streams consisting of cool, well-oxygenated water are necessary spawning habitat requirements. Streams may also be steep and rocky and surrounded by riparian vegetation.

Life History:

Southern Steelhead trout are winter run fish that spawn from December to May. Females lay between 500 and 3,100 eggs, which hatch in approximately 30 days. The young emerge from gravel nests four to six weeks later, and move into shallow stream margins. As juveniles increase in size they move into riffles then runs and pools. The first 1-3 years are spent in fresh water, which is followed by a migration to the ocean. Southern Steelhead trout return to fresh water to spawn generally when they are 4 years of age.

Santa Ana Speckled Dace **(*Rhinichthys osculus*)**



Status: **State (CDFG) - Species of Special Concern**

Description:

The Santa Ana Speckled Dace is a small fish of the family Cyprinidae ranging in size up to 80 mm SL.

Distribution and Habitat:

The Santa Ana Speckled Dace has lost much of its historical range, and is now limited to the headwaters of the Santa Ana and San Gabriel rivers. This species inhabits shallow cobble and gravel riffles of permanent streams. Streams have summer water temperatures ranging between 17 and 20 degrees Celsius. Overhanging vegetation and the low numbers of introduced species are essential for the Santa Ana Speckled Dace.

Life History:

Little is known about the life cycle of the Santa Ana Speckled Dace, although it is believed that individuals probably live up to three years.

Unarmored Threespine Stickleback (*Gasterosteus aculeatus williamsoni*)



Status: **Federal** – Endangered **State (CDFG)** – Fully Protected

Description:

The Unarmored Threespine Stickleback is small (less than 2.4 inches) fish of the Gasterosteidae family. The body is compressed and is spindle shaped. Three upright sharp spines are located anterior to the dorsal fin. The dorsal side is greenish or olive colored. The ventral side is a silvery color. This species is scaleless and has a small mouth.

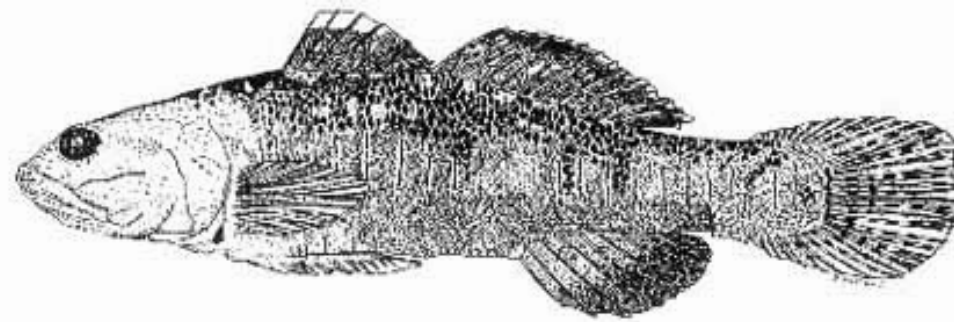
Distribution and Habitat:

Unarmored Threespine Sticklebacks are currently found in Los Angeles, Ventura, San Louis Obispo, and San Diego counties. They inhabit the Santa Clara River drainage, San Antonio Creek, and the San Felipe Creek. Slow-moving streams surrounded by dense vegetation provide an adequate environment for this species. Algal mats, rocks, or debris may provide shelter in open areas. Unarmored Threespine Sticklebacks prefer clear watered streams with mud or sand substrates.

Life History:

Breeding occurs throughout the year. Males secrete a substance from their kidneys that seals grass and sticks together to form a nest. Nests are usually located in shallow water on stream bottoms. Several females may deposit their eggs in each nest. Hatching occurs in approximately 6 days. The male will aggressively defend the area until the young leave the nest. The life cycle of the Unarmored Threespine Stickleback is believed to be only 1 year long. Individuals feed on insects, snails, small crustaceans, flat worms, and nematodes.

Tidewater Goby **(*Eucylogobius newberryi*)**



Status: **Federal** – Endangered **State (CDFG)** – Species of Special Concern

Description:

The Tidewater Goby is a small (less than 50 mm SL) fish of the family Gobiidae. The body is to some extent dorso-ventrally flattened, and is elongate in shape. The back, sides, and dorsal fin are dark olive colored. The coloration of the first dorsal fin is cream to orange, and partially transparent. Tidewater Gobies have small scales throughout the majority of their body however, they are lacking on the head, belly, chest, and sometimes the nape. The pelvic fins are fused, and form a ventral sucker disk. Individuals have large pectoral fins, and yellowish pelvic fins. A lateral line is absent in this species.

Habitat and Distribution:

The Tidewater Goby occurs irregularly throughout California. This species intermittently ranges from the mouth of the Smith River (Del Norte County) southward to Aqua Hedionda Lagoon (San Diego County). Tidewater Goby habitat within San Diego County include: San Mateo Creek, San Onofre Creek, Las Flores Creek, Hidden Creek, Aliso Creek, French Creek, Cocklebur Creek, Santa Margarita River, and Aqua Hedionda Lagoon. Tidewater Gobies inhabit coastal streams and lagoons with slow-moving or relatively still water. Shallow waters with sandy substrates are necessary for reproduction. The aquatic environment must have salinity level less than 10 parts per thousand.

Life History:

Tidewater Gobies are benthic animals that inhabit slow-moving streams and lagoons. The entire life cycle of this species occurs in fresh or brackish water. Breeding is thought to take place throughout the year however; peak spawning periods in southern California populations are known to occur between **April and June**. Males dig burrows 10-20 cm into sandy substrates of shallow waters. Females are capable of producing 640-800 eggs. The eggs are deposited and attached to the burrow walls. The male is responsible for guarding the nest. Approximately 9-10 days pass before larvae emerge from the nest. Larvae spend time amongst aquatic vegetation until they are approximately 15-18 SL. Tidewater Gobies engage in benthic foraging behaviors, feeding mostly on aquatic insects, small crustaceans, and molluscs.

Arroyo Chub (*Gila Orcutti*)



Status: **State (CDFG) – Species of Special Concern**

Description:

The Arroyo Chub (family Cyprinidae) is a small fish that generally ranges in size from 70-100 mm. Individuals have stocky bodies, small mouths, and large eyes. Dorsal coloration is silvery, gray, or olive. The ventral side is white, and a dull gray lateral band is usually present.

Distribution and Habitat:

The Arroyo Chub has lost much of its native range and is currently abundant only in the upper Santa Margarita River, Del Luz Creek, Trabuco Creek, Malibu Creek, and West Fork San Gabriel River. Arroyo Chubs prefer slow-moving or backwater areas of streams. Additional stream requirements are those of sand or mud substrates, with water temperatures ranging between 10-24 degrees Celsius.

Life History:

The Arroyo Chub Breeding season is generally from **February to August**. The average spawning water temperature is 14-22 degrees Celsius. Adults spawn in pools or along stream edges. Males use their snouts to rub the region below the female's pelvic fins, which induces eggs to be released. The eggs are then fertilized and become attached to the bottom of the pool. Hatching usually occurs within 4 days. The young Arroyo Chubs spend the first 3-4 months amongst vegetation in quiet water. Females reproduce after their first year. Individuals feed mostly on algae; however, will also consume insects, small crustaceans. Arroyo Chubs will usually live for up to four years.

Santa Ana Sucker **(*Catostomus santaanae*)**



Status: **Federal** – Threatened **State (CDFG)** – Species of Special Concern

Description:

The Santa Ana Sucker is a small (less than 200 mm SL) member of the Catostomidae family. The ventral side of the body is silvery, and the dorsal surface is darker with irregular blotches. Notches are located at the connections of upper and lower lips. The dorsal fin is short with 10 fin rays. This species has a deep caudal peduncle, and a black peritoneum. Pigmented membranes connect the rays of the caudal fin.

Distribution and Habitat:

Santa Ana Suckers are found in Los Angeles, Riverside, Orange, and San Bernardino counties. They inhabit drainages in the Los Angeles, Santa Ana, and San Gabriel river systems. A population occurs in the Santa Clara River but is thought to be introduced. This species is found in streams in which periodic flooding occurs. Small to medium sized streams with slight to swift moving water provide adequate habitat. They are generally found in permanent streams with rough substrates and clear water. Overhanging vegetation and deep holes provide cover for Santa Ana Suckers. The presence of algae is a critical habitat requirement.

Life History:

Spawning generally occurs between **March and July**. Females produce between 4,000 and 16,000 eggs. Hatching occurs within 360 hours at 13 degrees Celsius. The life cycle of Santa Ana Suckers is relatively short. The majority of individuals do not live beyond 2 years of age. Reproductive maturity is attained within the first year. Algae, detritus, and diatoms are the main constituents of their diet; however, they also feed on aquatic insects, fish eggs, and insect larvae.

California Newt (*Taricha torosa*)



Status: State (CDFG) – Species of Special Concern

Description:

The California Newt (family Salamandridae) is a relatively large salamander ranging from 2.75-3.5 inches. (6.9-8.7 cm) The skin is granular and varies in color. Individuals have a dark brown to black dorsal side, and a yellow to orange underside. The eyes protrude from the head. A neurotoxin called tetrodotoxin is present in California Newt eggs, as well as in the skin of adults and larvae.

Distribution and Habitat:

The California Newt occurs in coastal drainages from central Mendocino County southward to northern San Diego County at elevations from sea level up to 1830m. Breeding occurs in slow moving streams, ponds and reservoirs. Terrestrial habitats frequented by *T. torosa* include valley-foothill hardwood and hardwood-conifer habitats, as well as coastal scrub, grassland, and mixed chaparral.

Life History:

The California Newt spends most of the time in subterranean refuge sites. Adults emerge after substantial rainfall and migrate to breeding sites, where they often remain for several weeks. The breeding season varies, but is typically from **December to April**. Breeding adults are active during the daytime and at night. Eggs are fertilized internally shortly after the female collects spermatophores. Females deposit clusters of eggs in shallow water, which become attached to aquatic vegetation and rocks. Hatching occurs in approximately 4-6 weeks. Larvae seek cover underneath submerged rocks and debris. Larvae feed on aquatic invertebrates, and require 3-6 months of development before they reach metamorphosis. Juveniles and adults consume aquatic and terrestrial invertebrates, and the eggs of other amphibians. Adults leave breeding sites to migrate back to refuge sites where they remain during aestivation. Small mammal burrows, rocks, and logs provide terrestrial cover.

California Tiger Salamander (*Ambystoma californiense*)



Status: **Federal** – Endangered **State (CDFG)** - Protected

Description:

The California Tiger Salamander (family Ambysomatidae) is a large salamander ranging from 75-125mm SVL. The dorsal coloration of this terrestrial species is black, with several yellow or white spots. The ventral side of Tiger Salamanders varies. A number of individuals have a solid yellow or white coloration throughout, while others are multicolored. This group of stocky salamanders is distinguished by having wide rounded snouts and small protruding eyes.

Distribution and Habitat:

This species ranges from the vicinity of Petaluma, Sonoma County and Dunnigan, Colusa-Yolo County line (Storer 1925) with an isolated outpost north of the Sutter Buttes at Gray Lodge, Butte County (Hayes and Cliff 1982) in Central Valley, south to vernal pools in northwest Tulare County, and in the Coast Range south to ponds and vernal pools between Buellton and Lompoc in the Santa Ynez drainage, Santa Barbara County. California Tiger Salamanders inhabit long-lasting rain pools surrounded by grassland vegetation. They are restricted to elevations below 1,400 ft. Small mammal burrows located near breeding sites are a necessary habitat requirement during the dry-season.

Life History:

California Tiger Salamanders spend the majority of their lives in subterranean refuge sites. Adults emerge at night following periods of substantial rainfall. The breeding season varies, but is generally from **November to February**. Males arrive at breeding pools prior to females, and remain at the site for a longer duration of time. Females deposit 400-1,300 eggs individually or in small groups. The eggs are submerged in shallow water and are normally attached to vegetation or rocks. Hatching occurs 10 to 14 days after oviposition. Larvae initially consume algae, mosquito larvae, and small crustaceans, but as they grow larger will feed on smaller tadpoles and aquatic invertebrates. Metamorphosis is completed after approximately 8-10 weeks of development. Juveniles exit receding pools to seek refuge in small mammal burrows where they remain during the dry season. California Tiger Salamanders have a lengthy juvenile stage, and may require 4-5 years of development before they breed. Adults may only breed once or twice in ten years.

Arroyo Toad (*Bufo californicus*)



Status: Federal – Endangered State (CDFG) – Protected

Description:

The Arroyo Toad, (family Bufonidae) is an average sized toad ranging from 55-80 mm SUL. The dorsal side of *B. Californicus* is light olive green to tan, and usually has a lighter colored region toward the middle of the back. The ventral side is entirely white, lacking spots or markings. Arroyo Toads have a characteristic “V” shaped stripe that intersects the head and eyelids. A middorsal stripe is usually absent in this species.

Distribution and Habitat:

The Arroyo Toad traditionally has had a range extending from the upper Salinas river system (Monterey County) to the San Diego river system, through the Los Angeles Basin and Orange and Riverside coastal drainages. Habitat requirements for this species are extremely specialized. Adults use overflow pools beside streams of third order or greater for breeding. Adequate stream breeding habitats are those of slow-moving, shallow water with sandy or gravelly bottoms. Breeding pools must be located near a shoreline and sandy terraces. Damp areas that consist of less than ten percent vegetation cover are critical for the survival of juveniles. An area with an abundance of fine sand is a requirement for Arroyo Toad burrowing.

Life History:

Arroyo Toad behavior is influenced strongly by rainfall and temperature. The breeding season varies from year to year, but is generally from **January to July**. Adults emerge from overwintering sites after substantial rainfall, on nights with temperatures exceeding 45 degrees Fahrenheit. Males arrive first at breeding sites, and begin calling along the edges of shallow pools. Amplexus usually occurs at the calling site. Females lay 2,000-10,000 dark colored eggs into shallow waters, which hatch 4-6 days later. Larvae are affected by water temperature, and it may take up to 14 days of development until they are able to swim freely. Larvae consume organic material by filtering the substrate. Metamorphosis occurs after 65-85 days of development. Juveniles will remain in their streamside habitat for up to 9 weeks. During this time they forage at night for ants and beetles. Once juveniles have reached about 30mm in size, they will construct burrows 10-18cm deep in willow areas where they will remain until the following breeding season. Arroyo toads reach reproductive maturity in approximately 2 years.

Western Spadefoot Toad (*Spea [Scaphiopus] hammondi*)



Status:

Federal – Species of Special Concern

State (CDFG) – Species of Special Concern

Description:

The Western Spadefoot (family Pelobatidae) is an average sized toad ranging from 37.0-62.0 mm SUL. The dorsal side is green, gray, or brown, with orange or reddish tipped tubercles located on the surface of the skin. Four irregular, light-colored stripes are present on the back, which sometimes appear hourglass shaped. Western Spadefoot toads have a black colored spade on each of the hind feet, and distinctive eyes with pale gold irises and vertically elliptical shaped pupils. The ventral side of the body is entirely white.

Distribution and Habitat:

The Western Spadefoot historically ranged from Redding, Shasta County, southward to northwestern Baja California, Mexico at elevations up to 1363m. Western Spadefoots prefer lowland grassland habitat, and require temporary rainpools for breeding.

Temporary rainpools must last three weeks or longer, with water temperatures ranging between 9 and 30 degrees Celsius. This species retreats to subterranean burrowing sites during the dry-season, although little is known about the soil characteristics.

Life History:

The breeding season for Western Spadefoot Toads is from **January to May**. Adults emerge from burrowing sites following warm rains to congregate at breeding pools. Females deposit cylindrical clusters of 10-42 eggs onto vegetation, rocks and detritus in temporary rainpools. Water temperature affects the duration of embryonic and development, and hatching occurs in 0.6-6 days. Larvae feed mostly on algae and planktonic organisms. Larval development is also affected water temperature and is completed in 3-11 weeks. Adults are highly nocturnal and feed on crickets, flies, earthworms and other invertebrates. Western Spadefoots seek refuge in underground burrows during the dry season. Most individuals construct their own burrows however, some use small mammal burrows. Larval and metamorph Spadefoot toads may cue to their specific breeding pools and may return to that same pool to breed in the future.

California Red-Legged Frog (*Rana aurora draytonii*)



Status: **Federal** – Threatened **State (CDFG)** - Protected

Description:

The California Red-Legged Frog is a large frog of the family Ranidae ranging from 85-138 mm SUL. Individuals are reddish brown with lateral folds and black spots (usually with lighter centers) visible on the dorsal side. The ventral side is often red or red orange, however this coloration varies amongst individuals.

Distribution and Habitat:

California Red-Legged Frogs historically ranged from Shasta County, California, south to the Mexican border at elevations up to 1,500 meters. Populations are found in areas of deep, (0.7 m or greater) slow moving water surrounded by riparian vegetation. Breeding sites are variable, and include streams, ponds, marshes, lagoons, and deep pools. Aquatic habitats must have a salinity level less than 4.5 parts per thousand to prevent egg mortality. Individuals will leave breeding sites when water is unavailable and seek protection in small mammal burrows, and underneath downed trees, rocks, and debris.

Life History:

The Breeding season for California Red-Legged Frogs is generally from **November through April**. Males arrive at breeding sites 2-4 weeks prior to females, and call in groups of up to seven. Females attach 2,000-6,000 eggs to emergent vegetation following amplexus. Water temperature affects the duration of embryonic development, which typically lasts between 6 and 14 days. Larvae, which are thought to be algal grazers, spend most of their time hidden amongst emergent vegetation. Metamorphosis occurs after 4-5 months of development. Individuals become reproductively mature after approximately 3-4 years, and have an average life span of 8-10 years. Adults exhibit nocturnal behavior, foraging mostly on invertebrates. However, vertebrates such as small mammals and other frogs make up a large percentage of their diet. California Red-Legged Frogs will leave the breeding site during the dry season, migrating to upland habitat in search of refuge sites.

Western Pond Turtle (*Clemmys marmorata*)



Status: **Federal** – Species of Special Concern **State (CDFG)** - Protected

Description:

The Western Pond Turtle is medium sized ranging between 120-210 mm CL. Individuals have a low carapace that is typically olive or dark brown. Light and dark markings may radiate from the center of the scutes. The skin coloration is olive, yellow, orange, or brown and is often irregularly spotted. The plastron may be entirely light or dark, or have varied markings. A brown stripe stretches across the iris of the eye.

Distribution and Habitat:

The Western Pond Turtle historically was present in most Pacific slope drainages from Klickitat County, Washington southward to northern Baja California, Mexico. This highly aquatic species is found in ponds, streams, reservoirs and other slow-moving water environments. Vegetation, logs, rocks, and sand banks serve as basking sites and may be considered a habitat requirement. Shallow water and an abundance of aquatic vegetation are vital for hatchling survival. Terrestrial nesting sites are typically dug on unshaded slopes in substrates containing clay or silt. Nesting sites are somewhat southward facing, and are usually located within 200 m of the aquatic environment.

Life History:

Western Pond Turtles leave the aquatic environment to reproduce, aestivate, and overwinter. Individuals may be active year round in areas where surface water temperatures are consistently 15 degrees Celsius or higher. Basking, a behavior that regulates body temperature, occurs in and out of the water. Western Pond Turtles leave aquatic sites to bask when water temperatures are too low, and bask at the water's surface when air temperatures are too high. Mating usually occurs between **April and May**. Oviposition usually occurs between May and June. Females deposit 1-13 eggs into shallow nests near aquatic sites. Hatchlings spend time feeding on nekton in shallow waters with dense vegetation. Individuals generally require 7-11 years to reach reproductive maturity. Adults diets are mainly composed of aquatic invertebrates however, carrion and aquatic vegetation are also consumed.

Coast Horned Lizard (*Phrynosoma coronatum*)



Status: Federal – Species of Special Concern **State** (CDFG) - Protected

Description:

The Coast Horned Lizard is a relatively large lizard averaging 65-110 mm SVL. Individuals have a short tail, and a body that is dorsoventrally compressed. Large scales project backwards on the posterior end of the head. Fringe scales are present on the tail, and in two parallel rows on the lateral body. Dorsal coloration varies, but is generally yellow, gray, tan, white or reddish-brown. Dark spots, which usually are similar to the soil color, are located on the neck and back. Ventral coloration is white or yellowish, with dark spots.

Distribution and Habitat:

Coast Horned Lizards occur in southern California and northern Baja California, Mexico. Californian populations are found in Kern, Los Angeles, Santa Barbara, San Bernardino, Ventura, Riverside, Orange, and San Diego Counties. This species has a range from the Transverse Ranges southward to the Peninsular Ranges. Coast Horned Lizards can occur in a variety of different environments including valley-foothill, hardwood, conifer and riparian, as well as in pine-cypress junipers and annual grassland habitat. Individuals require areas with loose, fine soils, open areas for basking, and an abundance of native ants or other insects.

Life History:

The Coast Horned Lizard is a solitary animal that generally emerges from hibernation in March. The reproductive season varies from year to year, and geographically depending on local conditions. Southern California populations were reported to begin laying eggs from late **May through June**, with a mean clutch size of 13 eggs. Eggs are laid in nests constructed by the females in loose soil. Hatching occurs after approximately 2 months. Coast Horned Lizards forage on the ground, primarily feeding on native ants. Additional dietary components include wasps, grasshoppers, flies, caterpillars, and beetles. Daily activities are strongly affected by temperature. Basking is a behavior that is performed for thermoregulation.

Blunt-Nosed Leopard Lizard (*Gambelia Sila*)



Status: **Federal** – Threatened **State** (CDFG) – Fully Protected

Description:

The Blunt-Nosed Leopard Lizard (family Iguanidae) is a relatively large lizard ranging in size from 3 to 5 inches snout to vent. Individuals have a short, blunt snout and a long, rounded tail. The sides and back of *Gambelia sila* are black or dark brown, with a varied pattern of dark spots and yellowish colored cross bands. The ventral side of the body is white. Females develop red-orange markings on their sides during the breeding season. Males develop a salmon coloration during mating, which is visible on their sides and bellies.

Distribution and Habitat:

Blunt Nosed-Leopard Lizards inhabit the San Joaquin Valley and surrounding foothills. They are found in sparsely vegetated areas at elevations between 30 and 790 meters. Grasslands, alkali flats, washes, canyon floors, and arroyos are preferred habitat types. The Blunt Nosed Leopard Lizard uses small mammal burrows for shelter during extreme temperatures. Burrows are also used to provide protection from predators and to hibernate. Shallow tunnels are constructed and used temporarily when mammal burrows are not available.

Life History:

The breeding season is generally from **April to June**. Females construct chambers inside mammal burrows where she will lay 2-6 eggs in June or July. The incubation period lasts about 2 months, and hatching usually occurs from July to August. Blunt-Nosed Leopard Lizards hibernate during the winter, and become active when the weather gets warmer. Temperatures between 74 and 104 degrees Fahrenheit are ideal for activity above ground. Their diet is composed mostly of insects, but will sometimes feed on vegetation and smaller lizards. Grasshoppers, crickets, and moths are their primary food source.

Two-Striped Garter Snake *(Thamnophis hammondi)*



Status: State (CDFG) – Species of Special Concern

Description:

The Two-Striped Garter (family Colubridae) is a medium sized snake ranging between 60-101 cm TL. Dorsal coloration varies, but is typically olive, brown, or brownish gray. Lateral stripes are yellow-orange in color and are located singly on each side of the body. Individuals have a light tan colored iris.

Distribution and Habitat:

The Two-Striped Garter has a range extending from the Salinas Valley, through the Coast and Peninsular ranges southward to La Presna, Baja California, Mexico. Populations occur in an elevational range of sea level to 2,400 m. This species is highly aquatic, and generally found in terrestrial habitats associated with perennial or intermittent streams. A Rocky bedded stream surrounded by riparian vegetation is the ideal habitat for *T. hammondi*. Mammal burrows, crevices, and logs are generally frequented by individuals at night. Stream banks and rocks are commonly used as basking sites.

Life History:

Two-Striped Garter snakes are found in close proximity to water. Individuals hibernate during the winter, and emerge during the spring. Mating occurs in the **spring**. Between 1-25 young are born in the fall. Juveniles and adults feed mainly on fish, amphibians, fish eggs, and tadpoles. Individuals will also consume small mammals and invertebrates. The duration of developmental time required to reach sexual maturity is approximately 2-3 years.

San Diego Mountain Kingsnake (*Lampropeltis zonata pulchra*)



Status: **Federal** – Species of Special Concern **State** (CDFG) - Protected

Description:

The San Diego Mountain Kingsnake is a medium sized (53-108 cm TL) snake of the family Colubridae. Red, black, and white rings are present throughout the entirety of the body. Individuals have a black snout and a dark brown iris.

Distribution and Habitat:

The San Diego Mountain Kingsnake is found in the Santa Monica, Santa Ana, Santa Rosa, and Palomar mountains, as well as Hot springs, Cuyamaca, Laguna, and Corte Madera. Occurs most frequently in canyon bottoms of woodland habitat. The San Diego Mountain Kingsnake also inhabits riparian environments. Rocks and rock outcroppings provide refuge sites, and are probably a habitat requirement. Rocks also provide shelter for a variety of different animals, and are responsible for increasing the necessary food resources.

Life History:

The San Diego Mountain Kingsnake exhibits secretive behavior, and is rarely observed. Individuals will spend most of their time underneath objects shortly after emerging from overwintering sites in March, and become active mostly during the daytime. Mating probably occurs in **May**. Females lay 4-9 eggs in June-July. Two months of development is required before the eggs hatch. Captive individuals reach sexual maturity in 4-5 years. San Diego Mountain Kingsnakes are known to feed on Western Fence Lizards and Western Skinks; however, it is possible that there are additional components to their diet.

Rosy Boa **(*Lichanura trivirgata*)**



Status: **Federal** – Species of Special Concern

Description:

The Rosy Boa is a secretive snake of the Boidae family. Adults range in size from 22-40 inches. Individuals have a stout body with a blunt finger-like tail. They are yellowish tan to gray in color, and are marked by three reddish brown or rose colored longitudinal stripes. The head is small and has gray, beige, or orange colored eyes with vertically oriented pupils.

Habitat and Distribution:

The Rosy Boa ranges in California from the coast to the Colorado and Mojave deserts. They occur south of Los Angeles in desert and chaparral habitats associated with rocky shrubland, desert slopes, and canyons. Intermittent or permanent water sources are generally located in Rosy Boa habitat. Rosy Boas flourish in areas with moderate to dense vegetation or rock cover.

Life History:

The breeding season of the Rosy Boa is between **spring and early summer**. 6-10 young are born live, and have a relatively long life expectancy. Captive Rosy Boas have been reported living past 25 years. This species feeds primarily on small mammals and birds. Lizards may also be a component of the Rosy Boas diet.

Red Diamond Rattlesnake (*Crotalus ruber*)



Status:

Federal – Species of Special Concern

State (CDFG) – Species of Special Concern

Description:

The Red Diamond Rattlesnake is a large (75-163 cm) snake of the Viperidae family. The dorsal color of this heavy-bodied snake is tan, brick red, pink, or reddish with diamond shaped blotches. Individuals have a brown iris, white or pale yellow colored bellies, and tails that are pinkish on their undersurfaces. Black and white bands precede the rattles on adults.

Habitat and Distribution:

Red Diamond Rattlesnakes range from San Bernardino County, California southward to Loreto, Baja California, Mexico. Inhabits coastal and desert slopes of the Peninsular Ranges. Occurs in desert slope scrub and coastal sage scrub habitats. Areas that are composed of heavy brush appear to be the preferred vegetation type. Mammal burrows are frequented by Red Diamond Rattlesnakes, and may be a habitat requirement. Large rocks and boulders may also be used as refuge sites, and probably provide individuals with substantial food resources.

Life History:

The Red Diamond Rattlesnake is a secretive species that may have the ability to remain active year-round. Mating occurs between **March and April**. Eggs are fully developed in approximately 4 months. The young are born live in groups of 3-20 between July and September. Locations for safe birthing sites may include subterranean burrows and underneath large rocks. Little is known about the developmental stages of the Red Diamond Rattlesnake. Squirrels and rabbits make up the majority of Red Diamond's diet. This species will also feed on lizards, birds, rodents, fresh carrion, and other species of snakes.

Coast Patch-Nosed Snake
(*Salvadora hexalepis virgultea*)



Status: State (CDFG) – Species of Special Concern

Description:

The Coast Patch-Nosed Snake is a medium sized (55-115 cm TL) snake of the family Colubridae. A yellow or beige stripe is present mid-dorsally, and is darkly bordered. The coloration of the sides of the body is usually dark brown. The ventral side is white or cream colored, and sometimes has a pink or orangish tint on the underside of the tail and on the belly. The iris is black.

Distribution and Habitat:

The Coast Patch-Nosed Snake has a range extending from San Luis Obispo County southward to Baja California, Mexico. It occurs in lowland habitats at elevations up to 2120 m. Populations are found in areas of bushy or shrubby vegetation. Coastal chaparral, washes, desert scrub, and rocky terrain are all suitable habitat types for this species. The presence of sandy soils and mammal burrows may be additional habitat requirements for the Coast Patch-Nosed Snake.

Life History:

The Coast Patch-Nosed Snake engages in diurnal activities, and is rarely observed. Individuals have been observed emerging from overwintering sites in March. The breeding season probably occurs from April to June. Clutch sizes average between 5-6 eggs. This active snake consumes a variety of different foods, and appears to be an opportunistic feeder. Individuals are swift moving and will prey on small mammals, lizards, small snakes, and reptile eggs.

Southern Rubber Boa **(*Charina bottae*)**



Status: **State (CDFG) - Threatened**

Description:

The Southern Rubber Boa (family Boidae) is stout bodied snake ranging in size from 11.8-17.3 inches. (30-44 cm) Dorsal coloration varies from yellowish-brown to olive. The ventral side is a light yellow color. Individuals have smooth, shiny scales, and may appear rubbery looking. The tail is short and is sometimes mistaken for the head. The eyes are relatively small with vertical pupils.

Distribution, Habitat and Life History: Currently, little is known about the distribution and habitat requirements for this species. On-going studies on reptile distribution should provide some information, but it is clear that species-level monitoring and research involving the southern rubber boa is needed.

Photo Credits:

Cover – Western Long-nosed Snake and Kangaroo Rat (Tim E. Hovey) and Western Snowy Plover (Lyann Comrack).

- Figure 1. Plates 1, 2, 3, 4, 6, 7 and 8 (Tim E. Hovey).
- Figure 2. Rancho Jamul Ecological Reserve (Dave Lawhead)
- Figure 5. Crestridge Ecological Reserve (Dave Lawhead)
- Figure 8. Boden Canyon Ecological Reserve (Kim McKee-Lewis)
- Figure 10. Otay Mountain Ecological Reserve (Dave Lawhead)
- Figure 12. Hollenbeck Canyon Wildlife Area (Dave Lawhead)
- Figure 14. Carlsbad Highlands Ecological Reserve (Dave Lawhead)
- Figure 16. San Felipe Valley Wildlife Area (Robert Waldron)
- Figure 18. Buena Vista Lagoon Ecological Reserve (Linda Beim)
- Figure 20. Batiquitos Lagoon Ecological Reserve (Tim Dillingham)
- Figure 23. Upper Newport Bay Ecological Reserve (DFG File Photo)
- Figure 25. Bullfrog work-up (Kim McKee-Lewis)
- Figure 28. *Thamnophis hammondi* as prey item (Tim E. Hovey)

Species outline Plates

- Southern Steelehead (Alan Greenwood)
- Unarmored Three-spine Stickleback (Manna Warburton)
- Santa Ana Speckled Dace (Paul Barrett)
- Arroyo Chub (Paul Barrett)
- California Newt (Tim E. Hovey)
- Santa Ana Sucker (Paul Barrett)
- Arroyo Toad (Tim E. Hovey)
- California Tiger Salamander (Karl H. Switak)
- California Red-legged Frog (Tim E. Hovey)
- Western Spadefoot Toad (Chris Brown)
- Coast Horned Lizard (Tim E. Hovey)
- Western Pond Turtle (Tim E. Hovey)
- Two-striped Garter Snake (Tim E. Hovey)
- Blunt-nosed Leopard Lizard (Dennis Sheridan)
- Rosy Boa (Tim E. Hovey)
- San Diego Mountain Kingsnake (Bradford Hollingsworth)
- Coast Patch-nosed Snake (Karl H. Switek)
- Red Diamond Rattlesnake (Tim E. Hovey)
- Southern Rubber Boa (Robert Goodman)